Chapter 1
Background

1.1 Importance of Food Processing Industries in India

Food processing has an important role to play in linking Indian agriculture to consumers in the domestic and international markets. The agriculture sector in India contributes a fourth of the country's GDP and provides employment to approximately two thirds of the population. However, its potential has not been tapped due to underdevelopment of the food processing sector in India.

One of the most important challenges facing the country is providing remunerative prices to farmers for their produce without incurring the additional burden of subsidies. This challenge could be addressed if cereals, fruits, vegetables, milk, fish, meat and poultry etc. are processed for consumption in the domestic and international markets. The impact of increased economic growth in agribusiness through food processing can play a significant role in reducing rural poverty and increasing rural income.

Further, **food processing leads to significant employment generation**- not only directly but across the supply chain in production of raw materials, storage of produce and finished products and distribution of food products to consumers. For e.g. a grant of INR 66.7 million (total investment of approximately INR 250 to 300 million) to 35 units in UP in 2003-04 has resulted in direct employment of 2,500 and indirect employment of 20,000.

Processing of food **enhances shelf life of agricultural products** and thus reduces wastages. The role of food processing becomes critical since agricultural production is targeted to double in the next 10 years. With low farmer price realizations and wastage in the food supply chain being significant even with the current level of production, only processing of agri products can secure farmer incomes against a slump in prices as well as reduce wastages.

Further, a vibrant food processing industry can be a catalyst for **crop diversification**.

The big opportunity for India

As a food supplier...

India, with the second largest arable land in the world, and with diverse agro-climatic zones across the country, has tremendous production advantages in agriculture, with the potential to cultivate a vast range of agricultural products. For example, India produces 41% of world's mangoes, 30% of cauliflowers, 28% of tea, 23% of bananas, 24 % of cashewnuts, 36% of green peas and 10% of onions. This strong base in agriculture provides a large and varied raw material base for food processing. **These advantages if leveraged optimally, can translate into India becoming a leading food supplier to the world.**

Exhibit 1.1.A.: Key statistics on area and production of agricultural products

Production numbers are in million tonnes

	India	India's Rank in world production	India's share in production	India's share in Exports	USA	China	Brazil
Arable land (Million ha)	161	2			175	124	54
Irrigated land (million ha)	55	1			27	54	2.92
Wheat	65	2	12	0.02	56	86	6
Rice, Paddy	132	2	22	18	6.4	161	12
Coarse grains (including maize)	35	3	4	Negligible	276	133	44
Milk	88	1	16	Negligible	77	18	23
Fruits	47	2	10	Negligible	32	145	37
Vegetables	82	2	10	Negligible	39	529	31
Edible Oilseeds	25	3	7	Net importer	95	49	49
Pulses	12	1	21	Net importer	1	5	3
Sugarcane	289	2	21		31	92	383
Tea	0.88	1	28	12	-	0.8	0.08
Cattle (million)	226	1	16		96	103	4.5

Source: FAO, Rabobank Analysis

Trade in processed food products has increased to 75% of global agricultural trade from in year 2002 from 50% in year 1985 (Source: "Liberalizing Trade in Processed Foods" – A positioning paper by International Policy Council on Agriculture Food and Trade, April 2002). International agricultural trade increased from USD 233 bn in 1985 to USD 460 bn in 2002 (Source: FAO)

And as a consumer…

India with a population of 1.08 billion, growing at about 1.7 % per annum, (Source: Census Estimates) is a large and growing market for food products. Food is the single largest component of private consumption expenditure, accounting for as much as 49% of the total. Further, the upward mobility of income classes and increasing need for convenience and hygiene (discussed in detail in the chapter on food consumption) will drive demand for (a) perishables and non food staples and (b) processed foods.

However, the agri & food sector faces several challenges which hamper realization of potential. A long and fragmented supply chain is the single largest bottleneck facing the sector. This together with demand-related issues as well as regulatory distortions have cumulatively resulted in several inefficiencies. Comprehensive supply chain solutions are key to achieving sustainable development of the Food Processing sector in India.

1.2 Need for Mega-study and Vision Document

Growth of food processing industries has been sub-optimal because of high cost of production and distribution, lack of competitiveness of Indian products in the global market, and low level of domestic demand.

With a significant shift in India's demographic profile in favour of younger population, increasing disposable incomes and changing socio-economic environment, food consumption patterns are

set to change, in favour of processed foods which are convenient, hygienic and of consistent quality.

Further, with liberalization of trade in the post-WTO regime, India has the opportunity to export agricultural and food products to the world. Domestic support and export subsidies provided in developed countries (estimated at $ 400 billion) together with non-tariff barriers have been a restrictive factor for growth of Indian exports.

Given this scenario, it is critical to develop a vision for the food processing sector, together with a detailed strategy and implementation-oriented action plan to realize the potential of this sector, which can translate into improved farmer incomes, employment generation and increase in exports.

The Ministry of Food Processing industries engaged Rabo India to develop vision, strategy and action plan for food processing industries in India for the next ten years. The terms of reference of the assignment are as follows:

- Current status of various food processing industries (fruit & vegetable, meat & poultry, fish, dairy, grains & grain based products, edible oils, alcoholic and non-alcoholic beverages etc.)

Production

- Identification, development and propagation of processable varieties of agricultural commodities
- Current level of availability of raw material to the processing sector
- Producer's access to external funds and insurance
- Forward linkages with processors

Processing

- Key reasons for underdevelopment of the processing sector
- Analysis of the small-scale and unorganized sector in this area (their share in processing and technical, financial and commercial requirements)
- Backward linkages (like contract farming) and forward linkages (like organized retail chains)
- Direct and indirect employment generation in food processing sector per thousand crores investment

Consumption

- Current consumption level of various processed foods
- Key factors influencing demand – India and overseas
- Campaigns / marketing strategy to promote consumption of processed foods
- Means to enhance consumption through new distribution channels – the role of organized retail formats in promoting growth of the industry in India
- Trends in food imports

Exports

- Current status and future projection of exports of various products highlighting constraints and solutions (Competitive advantages and weaknesses, market intelligence etc.)
- Why some countries are major players in the processed food sector – what are the institutional and operational models employed
- Export potential in the context of WTO regime and SPS standards
- Issues with respect to market access, export subsidy and import tariffs etc.
- Prospects for outsourcing

Infrastructure

- Key issues faced by infrastructure providers like capacity utilization, power etc.
- Access to long-term and working capital finance
- Current status of facilities available for food testing

R&D

- Analysis of the current state of R & D infrastructure
- Linkages of technology institutes/research organizations with industry

Education/training

- Evaluation of current state of infrastructure for training farmers and entrepreneurs

Market Intelligence

- Status of Knowledge management / dissemination and Market Intelligence Systems

Legal and regulatory framework

- Status of legal and regulatory framework for the sector and impact

Other

- Status of foreign investment and project implementation difficulties faced by entrepreneurs
- Cost-benefit analysis of various capital-intensive and labour-intensive technologies
- Role of financial institutions, NGOs, farmer organizations and cooperatives

Vision

- To develop vision for food processing in the country as a whole and on a sector-specific basis
- Identify strategies and actions for realisation of the vision
- Role of the Government (Central and State) in shaping the course of food processing in India
- Identify prime movers for all major states

- Role and requirement of institutions for technology development and human resource development

The Vision should include projections for the next ten years for each of the processed food sectors. Such projections should be made on explicit and justifiable assumptions, which would involve collection of representative primary and secondary data, interactions with stakeholders etc.

1.3 Methodology

Given the wide canvas of the food processing sector, it was decided to understand the issues and develop vision, strategy and action plan for each sector. The sectors identified included:

- Fruits and vegetables
- Dairy
- Edible oils
- Meat and Poultry
- Grains
- Fisheries
- Non alcoholic beverages
- Alcoholic beverages (Focus on beer and wine)
- Sugar and confectionery

Since several issues are cross-sectoral, it was agreed that these could be detailed separately, such that the sectoral sections primarily focus on sector-specific issues. The cross-sectoral aspects which have been detailed in Part 1 are

- Consumption of food and processed foods
- Food Distribution
- Financing
- Exports
- Research & Development
- Human Resources
- Food Safety & Hygiene
- Taxation

Given the wide cross-section of food sectors to be covered and the need to obtain views of various stakeholders, it was agreed that a Consultative approach would be adopted to identify the potential of each sector and the bottlenecks hampering growth. Committees were constituted for each of the sectors as well as for the cross-sectoral areas listed above. Each Committee had a representation from various stakeholder groups including industry players, educational/research institutions, industry associations, and the central and state Governments (Refer Appendix 1)

The discussions with the Committee were used as a starting point for our interviews with various entities across stakeholder groups. These included processors, traders, exporters, cooperatives, Government officials at the State/Centre level, international food companies planning entry into India, banks, research institutes, consumers, sectoral experts etc. (Refer Appendix 2 and 3 for

details). As a part of this exercise, the project team visited farms, processing facilities, export units, AEZs, educational/research institutions, food testing laboratories, retailers etc. across the country (Refer Appendix 4)

Rabo tapped various secondary sources (databases and publications) to collect the required data. (Refer Appendix 5). Inputs were obtained from sectoral specialists across Rabobank's international offices to benchmark India's strengths in food & agribusiness with other leading producer/exporter countries, identify practices with respect to food standards and testing, exports, taxation etc.

The core team from Rabo India comprised of :

- Sanjiv Bhasin, CEO
- Sonal Shah, Director & Head, Strategic Advisory
- Hemendra Mathur, Senior Manager
- S Venkatraman, Senior Manager
- Partha Choudhury, Manager

The international experts from Rabobank's international offices included:

- Shanghai, China
- Sao Paulo, Brazil
- Utrecht, The Netherlands
- London, UK
- Bangkok, Thailand
- Singapore
- Sydney, Australia
- New York, USA

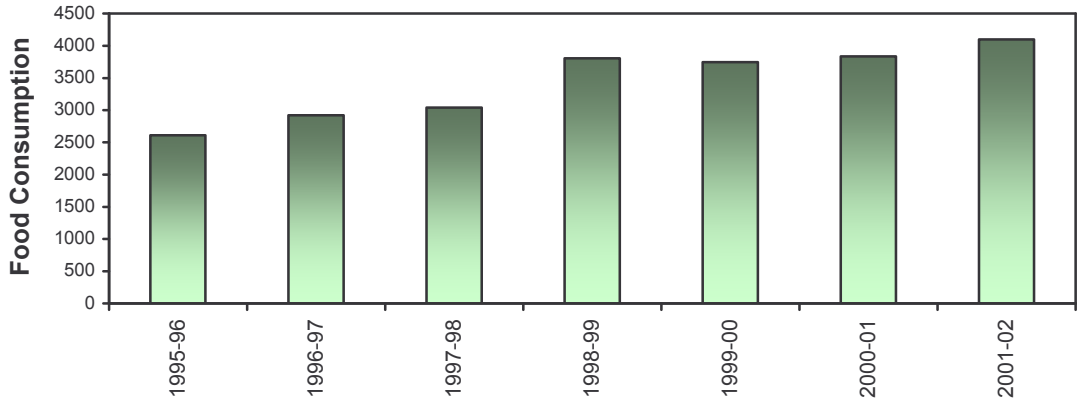
Chapter 2

Consumption of Food Products

2.1Consumption of Food Products

Consumption of food products in India was estimated at approximately INR 4,000 bn at the end of year 2002, at 1993-94 prices (INR 7,230 bn at 2001-02 prices) growing at a CAGR of 7.8% for the period 1996-02.

Exhibit 2.1.A: Consumption of food products (INR bn) at 1993-94 prices



Source: NSSO data and Rabobank Analysis

The consumption is driven primarily by increase in per capita expenditure. In the period 1996-2002, per capita expenditure grew by 5.9 % per annum, whereas population increased at the rate of 1.6%.

A. Consumption Basket

The breakdown of consumption by various categories is provided below. The share of cereal products is the highest followed by milk and milk products, vegetables, edible oil and meat products. The growth rates for fruits, vegetables, meat and dairy products are higher than for cereals and pulses, indicating a shift in consumption patterns. This in turn, implies the need for diversification in agricultural production to match the changing consumption preferences.

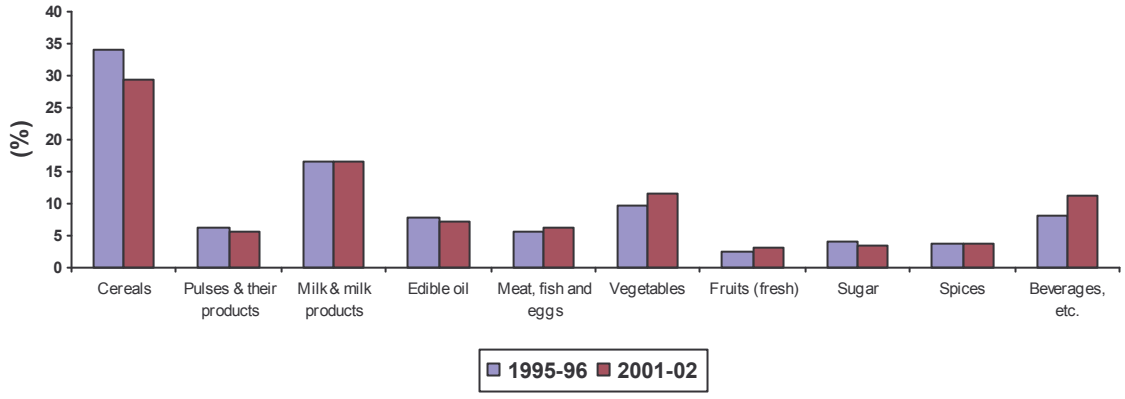
Exhibit 2.1.B: Consumption of Food by various categories at 1993-94 prices (INR bn)

Products*	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	CAGR
Cereal	894	984	1017	1262	1191	1185	1207	5.1%
Gram	7	11	11	9	8	9	10	5.7%
Cereal substitutes	3	3	4	4	5	4	5	9.2%
Pulses & their products	161	179	179	237	221	226	234	6.4%
Milk & milk products	436	522	514	606	626	633	677	7.6%
Edible oil	204	206	221	243	230	255	298	6.5%
Meat, fish and eggs	148	159	177	225	247	237	257	9.7%
Vegetables	252	270	318	399	393	448	481	11.4%
Fruits (fresh)	66	79	77	114	116	109	122	10.7%
Fruits (dry)	14	20	18	26	27	28	35	16.0%
Sugar	109	128	126	144	148	145	145	4.9%
Salt	9	10	10	14	13	14	14	8.5%
Spices	94	104	106	171	140	148	153	8.5%
Beverages and Snack foods	214	247	262	352	385	397	460	13.6%
Total	2611	2921	3039	3805	3748	3837	4097	**7.8%**

Source: NSSO data and Rabobank analysis
* Definition of products listed is in Appendix 6.

As highlighted in Exhibit 2.1.C, there is reduction in the share of cereals, pulses and increase in the share of meat, fruits and vegetables and beverages in consumption. The shares of milk and milk products and spices have remained constant.

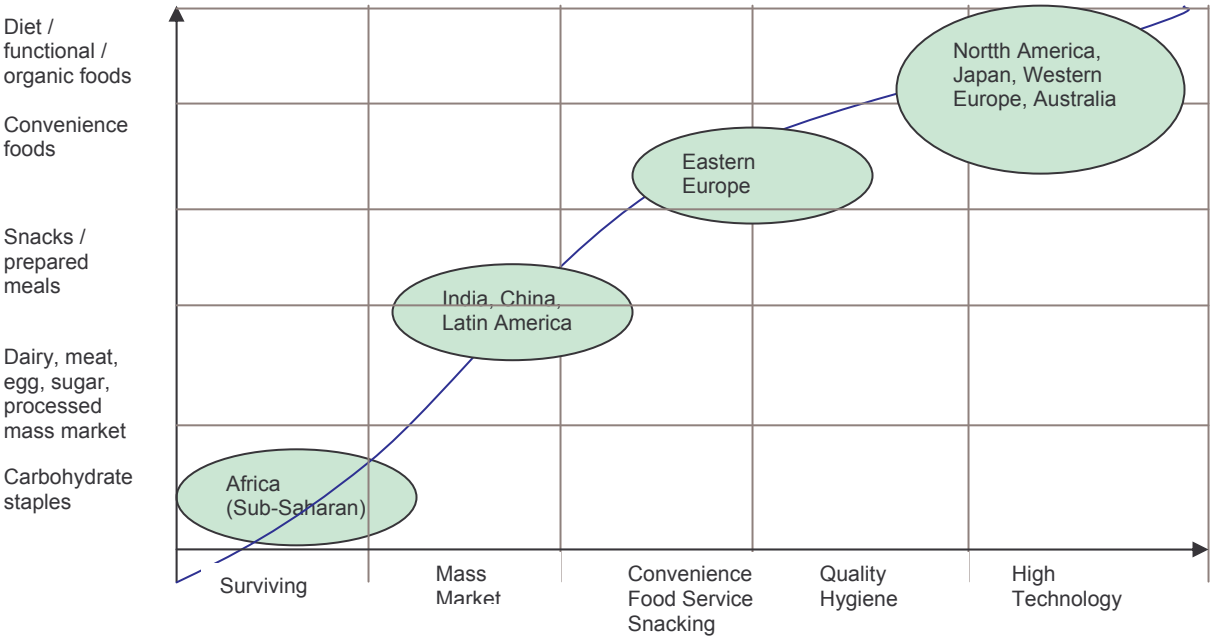
Exhibit 2.1.C: Share of food items in consumption basket (%)



Source: NSSO data and Rabobank analysis

This is in line with evolution of global food demand. There is a shift from carbohydrate staples (such as cereals, roots and tubers) to calories from animal sources and sugar. This trend is visible in most developing countries. In the next development cycle, there is likely to be increasing demand for prepared meals, snack foods and convenience foods, and further on, there will be demand for functional, organic and diet foods.

Exhibit 2.1.D: Evolution of Global Food Demand



Source: Rabobank International

According to FAO, the total energy intake in Asia has increased by 4 % p.a. to 2804 calories per person between 1990 and 2002 . The calorie intake from vegetal products increased at the rate of 2 % (to 2336 calories), whereas the calorie intake from animal products increased at the rate of 12% (to 466) in this period. It is expected that Asian consumption of animal products will continue to grow.

Food consumption in developed countries such as in Western Europe and North America is shifting in favour of convenience, functional and organic foods. Increasing obesity in some developed countries is necessitating that food processing companies identify niches to counter this challenge effectively. Demand for functional foods is on the rise from ageing population and higher incomes. Similarly, there is a set of consumers, who, on the back of health scares, are increasingly demanding details on origin of food products.

Exhibit 2.1.E: Challenges for the food industry to tackle the obesity backlash

Two-thirds of Americans are now overweight or obese. Over the last twenty years, obesity rates have doubled in adults and children and tripled in teens. In December 2001 the US Surgeon General warned that "obesity may soon cause as much preventable disease and death as smoking." In March 2003 the World Health Organization, examined the globalization of obesity: "Paradoxically coexisting with undernutrition, an escalating global epidemic of overweight and obesity – 'globesity' – is taking over many parts of the world. If immediate action is not taken, millions will suffer from an array of serious health disorders." **Over the past year, the fast-food industry and food manufacturers have faced an outbreak of obesity liability lawsuits. While some of the high-profile cases have been dismissed, the food industry is feeling the heat. According to industry analysts cited by Food Engineering magazine, "Anti-obesity measures will curb (food manufacturers') ability to grow revenues in the future."** Meanwhile, the food industry is catering to desperate dieters with new products like low carbohydrate beer and ice cream.

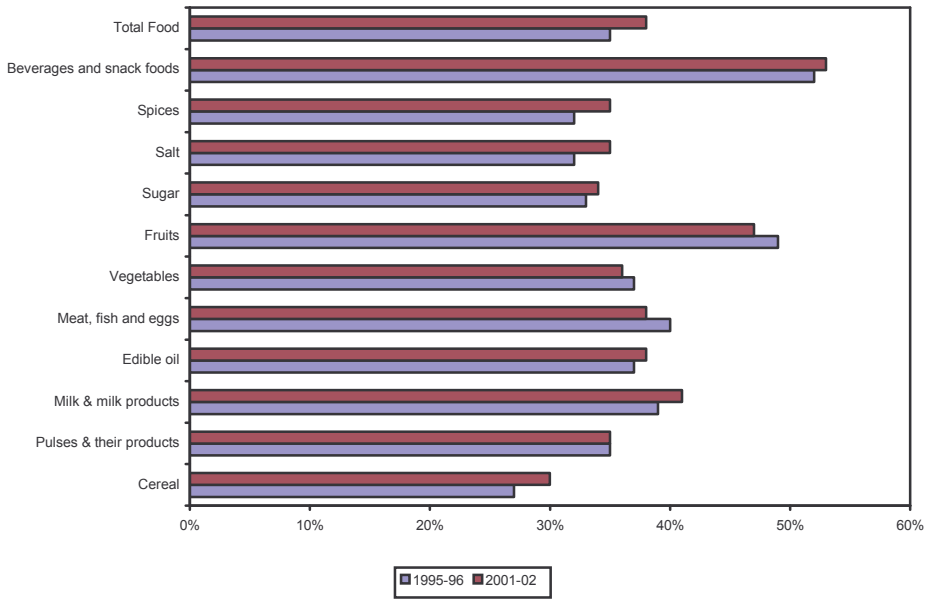
Source: ETC communiqué , Issue # 82 (November December 2003)

B. Urban and Rural food consumption in India

Urban India, with about 30% of population, accounts for 38% of consumption and its share is growing steadily with increasing urbanization. This implies higher per capita expenditure in urban areas. One of the reasons for this is that a part of consumption in rural areas is met by own farm production, and therefore does not reflect in consumer expenditure (Refer Appendix 7).

Urban food consumption was estimated at INR 1540 billion in the year 2001-02 (at 1993-94 prices). Urban areas have recorded annual growth of 9.1 % in consumption over the last seven years.

Exhibit 2.1 D : Share of Urban Food Consumption



Source: NSSO data and Rabobank Analysis

Rural India has recorded growth of 7% p.a. in food consumption over the same period. Meat, fish, eggs, fruits and vegetables and beverages have displayed robust growth both in urban and rural areas.

C. Food Consumption by States

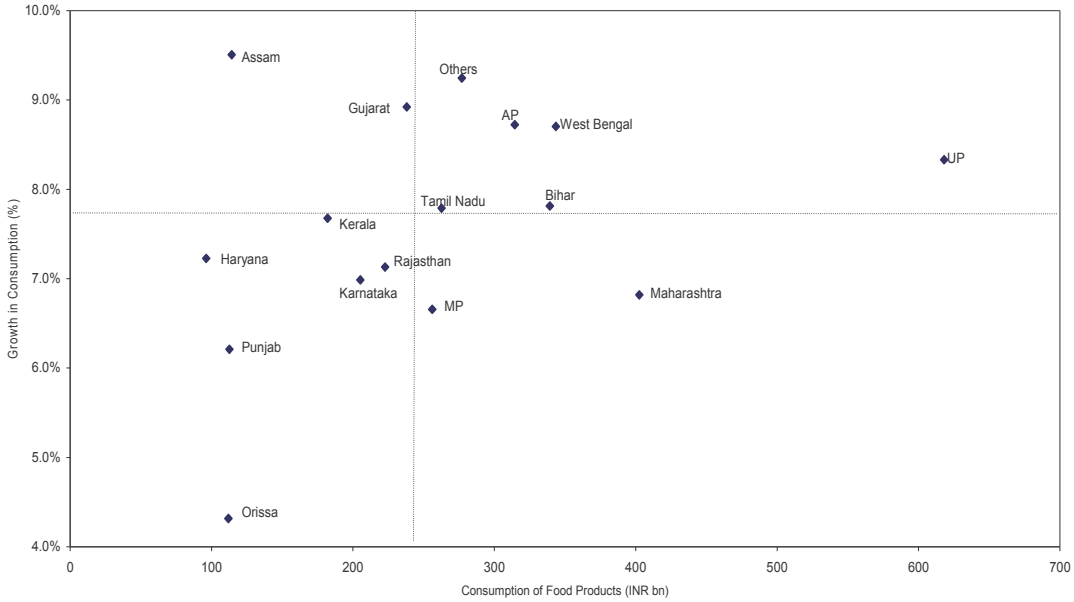
Uttar Pradesh (UP) is the largest consuming market for food products followed by Maharashtra, West Bengal, Bihar and Andhra Pradesh (AP). Among the fastest growing markets are Assam, Other North East states[1] Gujarat and AP.

Large markets like UP, Bihar, West Bengal, Tamil Nadu, AP and other North Eastern states continue to display high growth in food consumption driven by increase in population as well as in per capita consumption.

[1] Arunachal Pradesh, Sikkim, Meghalaya, Manipur, Nagaland, Tripura

Maharashtra, MP and Rajasthan, though large food markets, are displaying lower than average growth in food expenditure.

Exhibit 2.1.G: Consumption and Growth Rate across States



Source: NSSO Data and Rabobank Analysis. * Others include North East states and UTs

The annual per capita expenditure on food products is approximately INR 4,000. The states with higher than average per capita expenditure include Kerala, Punjab, Haryana, Tamil Nadu, Maharashtra, Gujarat and West Bengal (Refer Appendix 8)

2.2 Estimation and Projection of Food Consumption

India's total food consumption for 2003-04 is estimated at approximately INR 4760 bn at 1993-94 prices (approximately INR 8600 bn[2] at 2003-04 prices). Food consumption growth for 2010 and 2015 has been projected using three methodologies as tabulated below. The estimated food consumption in the year 2015 at 1993-94 prices, using various methodologies, is in the range of INR 8,800 to 10,130 billion. The methodologies used and the projected growth figures are tabulated below:

Exhibit 2.2 A : Projected Food Consumption for year 2010 and 2015 at 1993-94 prices

Method	Food Consumption 2010 (INR bn)	Food Consumption 2015 (INR bn)
1. Time Series Analysis	7,470	10,090
2. Regression with GDP		
Growth: 5%	6,680	8,800
Growth: 6%	6,750	8,890
Growth: 7%	6,820	8,990
Growth: 8%	6,900	9,680
3. Regression with population	8,310	10,130

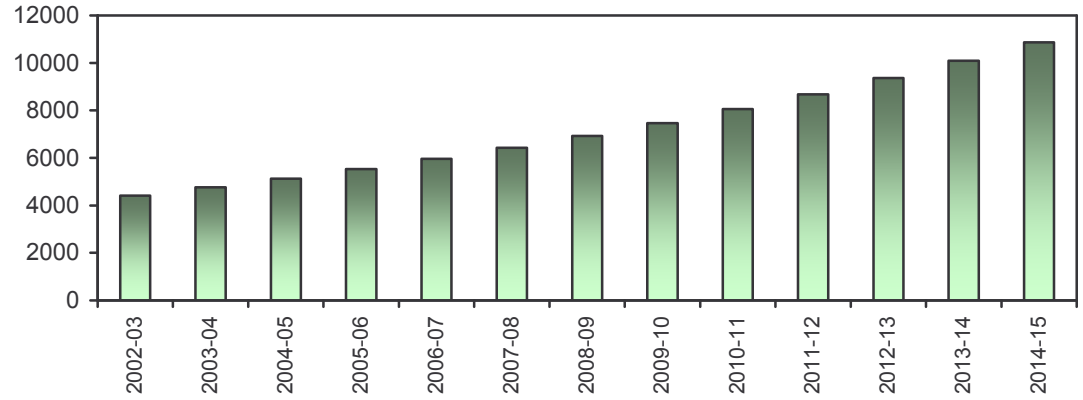
Source: Rabobank Analysis

2 Assuming a consumer price index for food products as 1.8 with base of 1993-94

1: Time Series Analysis

Food consumption is estimated to double from current levels, to INR 10,090 bn by 2015 (at 1993-94 prices) assuming a linear historical growth in food consumption of 7.6 % per annum.

Exhibit 2.2.B: Projected Food Consumption (INR bn) at 1993-94 prices, based on Time Series Analysis

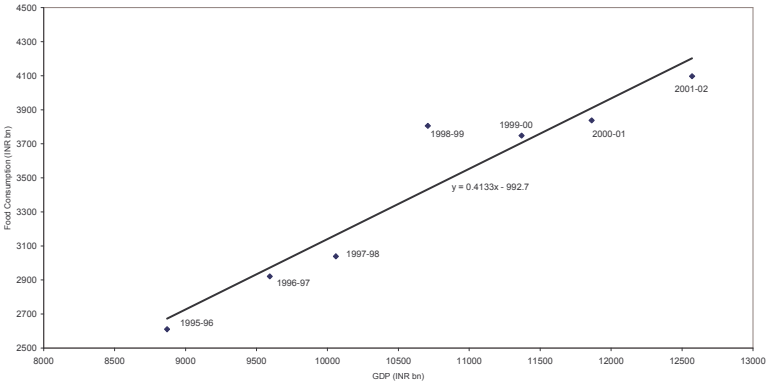


Source: NSSO Data, Rabobank Analysis

2: Regression Analysis with GDP

The income elasticity derived from regression of food consumption with GDP is estimated at 0.41 i.e. with every rupee increase in GDP, food expenditure increases by 0.41 Rupees The income elasticity graph and the trend line is as follows:

Exhibit 2.3.C: Income Elasticity for Foods and Beverages



Source: NSSO Data, Rabobank Analysis

The estimated food consumption assuming an income elasticity of 0.41 is estimated in the range of INR 8,804 bn (at 5% growth) to INR 9,084 bn (at 8% growth) in the year 2015.

Exhibit 2.2 D : Estimated GDP and food expenditure at 1993-94 prices

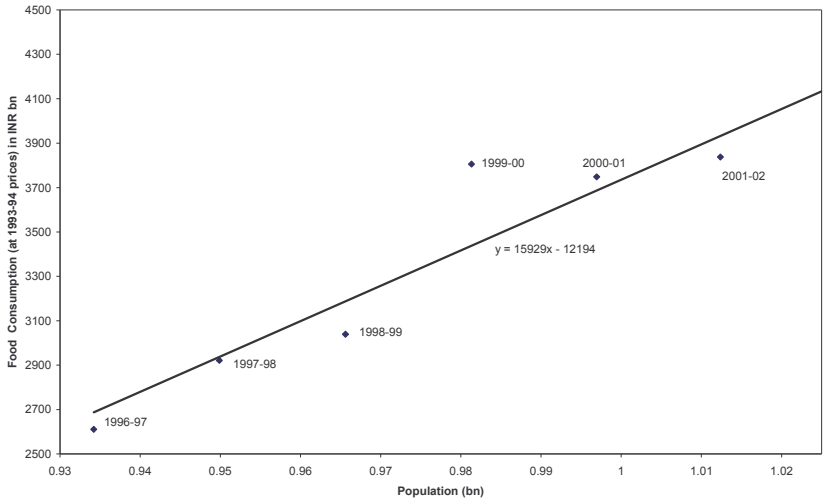
Growth Rate	5%		6%		7%		8%	
Year	GDP	Consumption	GDP	Consumption	GDP	Consumption	GDP	Consumption
2010	18572	6683	18749	6756	18926	6829	19103	6903
2015	23703	8804	23929	8897	24155	8991	24381	9084

Source: NSSO Data, Rabobank Analysis

3: Regression of consumption with population

The regression of food consumption with population is depicted in the following graph:

Exhibit 2.2.E: Food Consumption and Population Growth



Source: NSSO Data, Rabobank Analysis

Assuming population growth of 1.6% per annum over the next ten years, food consumption would be INR 8,310 bn in 2010 and INR 10,130 bn in 2015.

2.3 Level of Food Processing

The level of processing of food products, varies across segments. The level of processing for perishable products in the country, is significantly lower than in other countries. Processing of fruits and vegetables is less than 2% due to a combination of demand and supply side factors. For example, on the demand side, availability of a variety of fresh produce across the country together with preference for freshly cooked food has translated into restricted demand for fruit and vegetable-based processed foods. On the supply side, the fragmentation across the chain results in significant wastages and impacts amenability of the produce for processing. In the case of milk, the degree of processing is higher at 15% in the organized sector and 39% in the unorganized sector, respectively.

Exhibit 2.3.A: Level of Processing in Perishable Products

Products	Level of Processing		
	Organised	Unorganised[3]	Total
Fruits and Vegetables	1.4%	0.8%	2.2%
Milk & milk products	13%	22%	35%
Meat and Poultry			
Buffalo Meat	21%	-	21%
Poultry	6%	-	6%
Marine Products	8%	15%	21%

Source: Rabobank Analysis

[3] * unorganized sector in fruits and vegetables include jams, pickles, ketchups, squashes and potato chips manufactured in small scale sector, however it excludes processing in vends; unorganized in milk includes processing at vends (halwaiis) and unorganized in marine include processing by small and marginal fishermen

The processing level in non-perishable products such as cereals and pulses is more than 90% but a significant proportion is primary processed i.e. graded, sorted and milled.

2.4. Consumption of processed foods

The market size for processed foods for year 2003-04, at current prices is estimated at INR 4,600 bn, which is about 53 % of total food consumption. This includes processing in unorganized sector in dairy (Halwais) and grains (chakkis). The market size excluding these segments is about INR 3,300 bn. The market size of processed foods at factory cost for 2003-04 is estimated at INR 2,100 bn[4] implying about 60 % mark-up from factory cost to market price.

However, primary processed products constitute as much as 62 % of processed foods consumed, with value-added products being the balance 38%.

Exhibit 2.4 A: Estimated Total Food Market in 2003-04 (INR bn) at current prices

Total food Consumption*	8,600
Processed foods**	4,600
Primary processed food (includes packed fruits and vegetables, packed milk, unbranded edible oil, milled rice, flour, tea, coffee, sugar, pulses, spices and salt)	2,800
Value-added foods (includes processed fruits and vegetables- juices, jams, pickles, squashes, concentrate; processed dairy products - ghee, paneer, cheese, butter, ethnic Indian products; branded edible oil; breads, biscuits, snack foods, pasta based foods; processed meat, poultry and marine products; confectionery and chocolates; alcoholic beverages - beer, spirits, wine; aerated and malted beverages)	1,800

*excluding consumption of alcoholic beverages and out-of -home consumption

**excluding out-of-home consumption but including alcoholic beverages and processing in unorganized sectors in dairy (halwais) and grain milling (chakkis)

Source: Rabobank Analysis

2.4.1 Demand side factors

The demand for processed foods in India is constrained by low income and socio-cultural factors.

A. Low income:

Foods and beverages account for 49% of total expenditure by Indian consumers. Low per capita income and higher share of food in the consumption basket leads to higher price sensitivity and higher income elasticity in relation to food expenditure.

Exhibit 2.4.1.A: GDP per capita, share of food in total consumption and income elasticity

Country	Per capita GDP (USD) in PPP	Share of food expenditure in total expenditure (%)	Income elasticity for food and beverages
USA	35060	9.7	0.1
Japan	26070	14.9	0.29
UK	25870	16.4	0.33
Brazil	7250	22.7	0.62
Indonesia	2990	50.6	0.68
India	2570	53	0.41*
Bangladesh	1720	56	0.73

Source: USDA, Rabobank analysis,

*Estimated on the basis of data for 1996-2002

[4]Source: Central Statistical Organisation

B. Socio-cultural factors

- Indians prefer freshly cooked products as compared to packaged products. Traditionally, fresh has always been regarded as nutritious and these beliefs are being vindicated by medical research which underlines the advantages of consumption of certain products such as fruit in raw form, given their high fibre and vitamin content and anti-oxidant properties.
- Significant variations in food habits and cooking recipes across the country translates into preference for preparing foods at home, as opposed to purchasing food from the shelf.
- The share of working women, while on the increase, is still less than 10%, even in Socio-economic classes A and B[5] in metropolitan cities. This, together with relatively easy availability of domestic help facilitates meal preparation at home, and has consequently led to low growth in demand for processed products.
- Raw materials and ingredients required for preparation of food at home are easily available. This is in contrast with other countries, where such a wide variety of food products are not easily available in raw form i.e. milk in Thailand; fresh produce in Middle East etc.
- Indian consumers prefer consumption of foods at home. Out-of-home food consumption is estimated at INR 350 bn,(Year 2003, Source: Rabobank) which is approximately 4% of the total food consumed at home. In the USA, the share of out-of-home consumption is as much as 50% of the total, while in the UK, it is about a third.

2.4.2 Supply side factors

The supply side factors constraining the demand for processed foods include high cost of raw material (driven by low productivity and poor agronomic practices), lack of scale, presence of intermediaries, high cost of packaging, and high cost and poor quality of distribution.

(1) Cost of raw material (farm produce)

The cost of raw material is high due to lower productivity and lack of farmer knowledge of efficient crop management practices. A comparison of productivity of India with that of other countries for key agricultural products is as follows:

Exhibit 2.4.2.A: A Comparison of Productivity (Kg per Hectare)

	Cereals	Coarse Grains	Pulses	Fruit	Vegetables	Sugarcane
World	3,078	2,980	793	9,563	16,846	65,293
China	4,849	4,399	1,507	8,214	19,158	69,556
India	2,356	1,179	552	11,811	12,898	62,859
Pakistan	2,302	1,008	465	8,590	13,426	47,934
Brazil	3,364	3,568	802	14,232	18,758	72,289
Philippines	2,813	1,802	723	11,650	8,481	67,104
Thailand	2,584	3,702	900	9,219	8,878	66,400
United Kingdom	7,030	5,906	3,638	11,794	21,770	-
United States of America	6,033	7,843	1,803	22,934	27,099	77,515
Differential in productivity: India and World Average	-23%	-60%	-30%	24%	-23%	-4%

Source: FAO, Rabobank Analysis

The phenomenon of low productivity is underpinned by several factors including:

[5] Socio Economic Classification is a surrogate of household income. It is arrived on the basis of education and occupation of Chief Wage Earner. There are five classes – A, B, C , D and E.. A and B are top 2 income classes which constitute about 33% of population.

- Limited farmer knowledge of appropriate varieties to be cultivated, thus leading to sub-optimal yields
- Lack of 'precision approach' to cultivation practices such as quantum of fertilizers to be applied across different growth stages of the crop, optimal usage of water, crop rotation, usage of micronutrients, harvesting techniques
- Lack of availability of requisite quality and quantity of various agri inputs, driven by poor delivery channels and limited availability of credit

(2) Lack of Scale

Internationally, the growth strategy of many food companies has led to a wave of mergers, acquisitions and alliances resulting in increased scale of economies, thus reducing the cost of food. The world's largest food processors are diverse, with business interests across sub-segments.

In contrast, Indian companies' scale of operations is small and restricted to few products. The lack of scale, is due to a combination of supply-side factors, regulatory restrictions as well as demand-related factors as mentioned earlier. This in turn leads to high unit cost of production and low global competitiveness. They are unable to reinvest in quality and brand / market development.

Exhibit 2.4.2.B: Scale of operations: Indian food companies and International Food companies

Company	Total sales (in USD billion)	Food and Agri sales (in USD billion)	Semi - finished / industrial products	Bakery	Beverages	Dairy Ice creams	Meat, fish	Prepared foods, Snacks	Edible oil	Sugar and confectionery	Others
Top 5 International Food Companies											
1. Nestle (CH)	65.4	54.3		*	***	***		**	**	**	***
2. Cargill (US)	59.9	53.9	***				**				**
3. Kraft Foods (US)	31.0	31.0		**	**	***	*	***	*	**	*
4. ADM (CH)	30.7	30.7	***								*
5. Unilever (GB/NL)	48.6	27.2	*	**	*	**		***	***	*	***
Top 5 Indian Food Companies											
1. GCMMF	0.6	0.6				***		*			
2. Nestle	0.5	0.5		*	***	***		**		**	**
3. HLL	2.2	0.4		**	***	*	*			*	**
4. Britannia	0.3	0.3		***		*					
5. Tata Tea	0.16	0.16			***						

Food sales are estimates; tobacco and aerated beverages companies are excluded. * indicates the relative importance of segment in company's business portfolio, Sales are for year 2003 for international companies and for 2003-04 for Indian companies

(3) Presence of intermediaries

The supply chain in fresh produce has several intermediaries from the farm to the consumer. While the intermediaries have a role to play in transportation of produce as well as temporary storage, multiple-level manual handling on this account together with inappropriate facilities for storage and transportation, and intermediary margins translate into cost build-up, leading to high

consumer prices. As an illustration, the key issues in the fresh produce supply chain are listed below.

Exhibit 2.4.2.C: Supply chain for fruits and vegetables and issues

Supply chain	Farmer	Village Comm. Agent	District Comm. Agent	Wholesaler	Sub-wholesaler	Retailer	Consumer
Margin- % share of final price	35%	15%	10%	10%	10%	20%	
Issues	▪ Non-transparent pricing ▪ Limited financial capability ▪ Primitive cleaning sorting& grading facilities	▪ Wastage rampant ▪ Lack of quality & hygiene consciousness ▪ Lop-sided pricing ▪ Opportunistic profiteering					▪ High prices ▪ Limited choices

Source: Rabobank Research

Also, the long supply chain leads to lack of direct communication between the processor and the farmer, mismatch between demand and supply and lack of farmer awareness of price trends of produce. For instance, transactions at fresh produce mandis are undertaken by commission agents, using the hatha system. The farmer, who often does not visit the mandi, is not paid the actual price fetched by his produce, by the commission agent.

(4) Cost of packaging: packaging material / machinery

Cost of packaging is a significant proportion of the end consumer price for processed foods and significantly reduces consumer's affordability. The reason for high cost of packaging is on account of high cost of packaging material including statutory levies on packaging, as well as high cost of packaging machinery.

Exhibit 2.4.2.D: Share of packaging cost in consumer price

Product	Share of packaging cost
Potato Chips	20%
Fruit Juice	19%
Jam	12%
Chicken Nuggets	8%
Branded Atta	6%

Source: Rabobank Research

A large share of food is bought in small packs, which further leads to higher share of packaging costs as a proportion of total costs.

Exhibit 2.4.2.E: Share of Pack Sizes in Retail Sales

Vanaspati (pack size)	Share (%)	Biscuits	Share (%)	Tea	Share (%)
< 500 grams	20	<=100gm	56	<=100gm	18
1000 grams	71	200-400gm	39	200-500 gram	62
>1000 grams	9	>500gm	5	> 500 gram	20

Source: Rabobank Research

(5). Cost and quality of distribution

Worldwide, the sale of food through organised retail outlets has been on the rise in recent years. The advent of modern technology has facilitated large-scale retailing supported by controlled temperature corridors for transportation from farm to shelf. Procurement synergies have allowed large retailers to offer a wide range of products at competitive prices. Organised food retail formats account for 72 % of global food sales. This share is less than one percent in India. A

comparison of the top 5 international and Indian food retailers highlights the significant difference in scale of operations.

Exhibit 2.4.2.F: Food Sales of Top 5 International and Indian Retailers

	International Retailers (USD bn)		Indian Retailers (USD bn)	
1	Wal-Mart (USA)	112	Margin Free	0.11
2	Carrefour (France)	62	Food World	0.1
3	Ahold (The Netherlands)	53	Subhiksha	0.04
4	Kroger (USA)	38	Safal	0.01
5	Tesco (UK)	38	Nilgiri's	0.01

Estimated figures are for food sales for the year 2003
Source: Rabobank Estimates

There are an estimated 12 million retail outlets in India, with a total retail space of about 2 billion sq ft. About 5 million of these outlets are engaged in retailing of food and food products. The degree of fragmentation is much higher among food retailers than among non-food retailers. The majority of food and food products are retailed through neighbourhood *kirana* stores. A typical kirana store has a retail area of 200 sq. ft and sells 500 to 800 stock-keeping units (SKUs). The kirana stores focus on dry food products in the absence of infrastructure for cold storage. Bulk of fresh produce is sold by vendors with push carts. Meat, poultry and marine products are primarily sold by small retailers in wet markets. Such produce is associated with low product quality, lack of variety and low hygiene levels.

A kirana store's single largest advantage over organised formats is its proximity to consumers. However, the limited space of such stores, together with capital constraints of the operators, has translated into restricted choice, low value for money, poor quality and lack of shopping experience for the customer. There have been instances of significant deterioration of food products which have short shelf lives, on account of the poor hygiene and storage conditions at retail outlets.

The fragmented retail structure results in inefficient storage and transportation of food products, wastages and value loss, and high cost of distribution. Many companies use logistics service providers and C & F agents to reach retailers. The margins for each of these intermediaries are as follows:

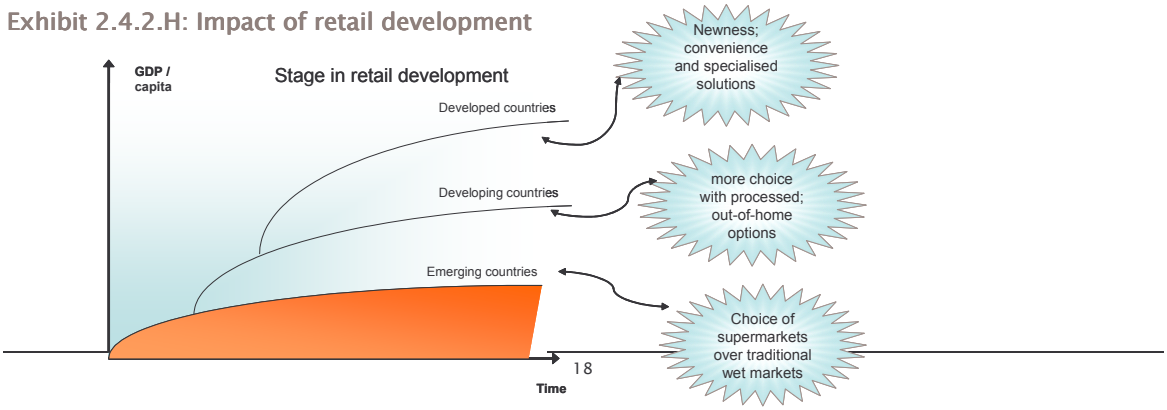
Exhibit 2.4.2.G: Cost of distribution

Intermediaries	Margins (%)
Logistics Cost (including C & F Agent margin)	0.5-1.5
Wholesaler	4-7
Retailer	10-20

Source: Rabobank Research

Orgnaised food retailing can play an important role in the growth of consumption of processed food items as seen below. The stage of retail development impacts the consumption pattern of consumers. The consumption of processed food displays high correlation with the development of organized food retailing.

Exhibit 2.4.2.H: Impact of retail development



Organised retail reduces the number of intermediaries and transaction costs. It allows more choice and a superior shopping experience to the consumer, as compared to wet markets. Further, it enables processors to test market their products effectively. The players in the current distribution structure, are risk-averse, given the small scale of their operations and hence resist stocking of new products.

(6) Tax structure

The incidence of taxes on food is high in India as compared to other countries thus reducing the affordability of processed foods. Central and State tax levies together increase costs by as much as 30-40%. As against this, there is zero taxation on food & beverages (excluding liquor) in several countries such as UK, Ireland, Malaysia etc, with the objective of ensuring affordability of these products.

Exhibit 2.4.2.I: Excise and Sales Tax Structure on Food Products

Country	Excise	Sales Tax
India	0-24	5-20
UK	Nil	Nil
Ireland	Nil	Nil
Thailand	Nil	7
USA	Nil	Nil
Malaysia	Nil	Nil

Source: Rabobank

As an illustration, the average tax incidence, taking into account excise, as well as state taxes such as octroi, sales tax etc., for three products is tabulated below.

Exhibit 2.4.2.J: Tax incidence

Product	Tax Incidence (%)
Biscuits	20.8
Condensed Milk	26.9
Jams	14.6

Source: Rabobank Research

In summary, the cost of processed food is high due to cost and quality of farm produce, infrastructure, credit, processing, packaging, long and fragmented supply chain, taxes, regulations and lack of scale.

Exhibit 2.4.2.K: Cost-build-up for Food Products (INR)

	Branded Atta (per Kg)	Fruit Juice (per 1 litre)	Potato Chips (per 35 grams pack)	Jam (per 500 grams)	Branded Chicken Nuggets (per 1 kg)
MRP	**12**	**68**	**10**	**50**	**189**
Retailer's Margin	0.89		0.83	7.2	38.3
Distributor's Margin	0.53	15.3	0.44	2.18	
Sales Tax	0.41	8.2	0.94	5.37	16.5
Discount / Scheme	1.53		0.41		
Transportation / Distribution	0.25	2.7	0	2.81	13.7
Processor's margin	-1.11	18.4	2.22	14.81	18
Packing Material	0.75	12.6	2	6.18	16
Excise duty					7.2
Mfg Variable Cost / Processing	0.75	5.1	0.85	1.06	9
Raw Material cost to processor	**8**	**6.2**	**1**	**9.52**	**64**
Freight / Octoroi	0.05				5.4
Movement to stockist	0.15				
Mandi charges (Auction / Aadhat)	0.30	0.3			
Farmer	**7.50**	**4.7**			

Source: Rabobank Research

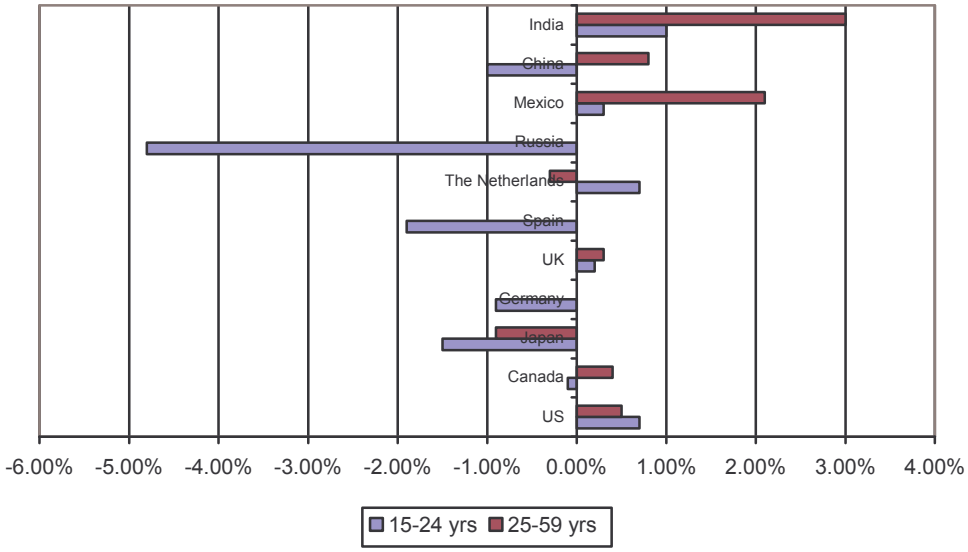
2.4.3. Demand Drivers

Constraints notwithstanding, there are several factors which are driving demand for processed foods. The key growth drivers are listed below:

- Changing age profile

The changing age profile with increasing share of population in the age bracket of 15-59 years, a large proportion of which constitute the active workforce, augurs well for the growth of food consumption. This group has the willingness as well as the ability to spend on processed foods. In contrast, in many developed countries, the population is aging with a growing share of the 60+ segment.

Exhibit 2.4.3.A: Growth Rate of 15-24 years and 25-59 years age group



Source: Rabobank Research

- Increasing income

Upward mobility of income classes is likely to increase the demand for processed foods – as has already been demonstrated in Europe, the USA and more recently, in several countries in South East Asia. The middle and upper middle income groups in India, are growing faster than the low income groups.

Exhibit 2.4.3.B : Distribution of Households by Income Group

Figures in million households

	2001-02	2006-07	2009-10*	2014-15*
< INR 16,000	24	17	12	7
INR 16,000 - 22,000	33	20	14	7
INR 22,000 - 45,000	74	82	81	73
INR 45,000 - Rs. 215,000	46	76	95	127
> INR 215,000	2	5	9	20

Source: NCAER for 2001-02 and 2006-07 estimates

* 2009-10 and 2014-15 are Rabobank estimates

The growth in food consumption in developed countries is in line with population growth, and is not affected significantly by increase in income. In developing countries, the impact of rising incomes is two-fold:

- significant share of additional income is spent on food due to higher income elasticity
- substitution of staples with animal protein and processed foods

➢ Emergence of Organized food retail

Sales through organised food retailing is estimated at INR. 16 bn (less than 1% of food retail sales). This has displayed rapid growth, albeit from a small base, exceeding 40 % annually.

Key drivers of organised food retailing include increasing need for convenience and choice, availability of quality retail space and investment in the upstream supply chain (Refer to Chapter 3).

➢ Lifestyle factors

A. Increasing health consciousness

Increasing health consciousness and growing concern about environmental issues with changing lifestyles, will further drive growth of products which are hygienic and healthy. An increasing number of players in fruit juices, edible oils, and dairy are adopting the health plank as the bedrock for positioning their products.

That food consumption is significantly affected by consumers concern about health, is well borne out by consumer and retailer response to recent disease outbreaks. One sector that has been affected as a result of these incidents is frozen processed red meat. The BSE and foot-and-mouth crises boosted demand for healthier non-red meat alternatives in Europe. Frozen processed poultry and, to a lesser extent, frozen processed fish and seafood, benefited most from this shift in consumer preferences. In the period 1998-2003, frozen processed poultry retail value sales grew by 27% in Western Europe and 30% in Scandinavia. The sector is expected to increase its share in the future, eating into the share of frozen processed red meat, whose value sales growth in Western Europe over the same period was just 6%.

Also “Reduced-calorie meals” are growing faster in Western Europe. This has been driven by manufacturers like Heinz and Nestlé tapping into the preoccupation of consumers with health and self-image. Ready meal manufacturers are responding to this requirement, by launching carefully conceived products targeting specific consumer groups.

B. Need for convenience

Another important lifestyle related aspect is the need for convenience - which includes convenience in purchase as well as convenience in carrying, cooking and eating. Portability and single serve packaging are on the rise to meet the need to "eat-where-you-are." Convenience, together with health consciousness, has played an important role in growth of categories such as mineral water and packed fruit juices.

The consumer’s changing lifestyle will necessitate that food processors increasingly focus on product and process innovation, to cater to consumer demand effectively.

Seeking comfort foods to beat stress: an emerging demand driver

British consumers spent a total of £920m (US$1.66bn) on premium treats and comfort foods in 2003.Consumers' expenditure on premium indulgence will increase by over 25% per annum and the number of premium treats per person per year will increase from 50 in 2003 to 63 in 2008. For manufacturers, the treating occasion represents an opportunity to capitalise on consumers' desire for quality over value-for-money by focusing new product development and marketing efforts on the indulgence aspects of products.

Chocolate is at the forefront

Chocolate is for many the ultimate stress buster, accounting for 43% of total spend on premium indulgence. Categories recording rapid growth are snack nuts, juices and bread. Although the market for premium snack nuts is currently very small with an overall value of only £6.2m in 2003, it is forecast to increase by 40%, to almost £9m in 2008. Juices are the second fastest growing category, with forecast sales of £151m by 2008. Bread has also benefited from this self-indulgence trend as consumers have rediscovered bread produced according to artisanal, traditional methods, with higher quality ingredients. Many supermarkets now offer a wide variety of premium breads from in-store bakeries. Sales of premium bread are set to increase by a third, from £190m in 2003 to £252m in 2008.

Premium snacking is a small oasis of 'me time'

Stress and the subsequent need to unwind and relax is one of the main drivers behind the increase in self-indulgent food and drink consumption. Self-indulgent treating fulfils a very important psychological function. Indulging in a premium snack is a self-centred activity, a small moment of relaxation, of "me-time". Although this applies to snacking generally, it is particularly relevant to premium snacks, which have a higher focus on indulgence, taste, and quality.

Manufacturers can take advantage of this by positioning their products as rewards rather than simply as products that provide functional and tangible benefits. This blurring of consumers' perception of what constitutes a need and what is merely a desire is becoming part of regular consumption behaviour, which is a trend likely to endure since people do not generally cut down on necessities.

Source: Rabobank research, news articles

The changing age profile, increasing disposable incomes and emerging lifestyles, together with a shift in food distribution, will drive the growth in demand for processed foods. In order to expedite the growth of processed food consumption, the following measures are required:

1. Promotional campaigns for consumers highlighting the benefits of processed foods (healthy, convenient, assured quality) and mitigating consumer's negative perceptions about processed foods vis a vis fresh products. The campaign could be either generic or be focused on a few products highlighting product-specific unique selling proposition.
2. Increase availability of processed foods through upgradation of existing outlets selling food products and promoting investment in modern retail formats (discussed in detail in chapter 3 on food distribution)
3. Increase affordability of processed foods through supply chain dis-intermediation; cost-effective financing; reduction in cost of packaging and various taxes levied on food products (detailed in subsequent sections of this report)

Chapter 3

Distribution of Food Products

3.1 Background

The Indian supply chain for food products is characterized by extensive wastage and poor handling. The wastage occurs because of multiple points of manual handling, inadequate packaging, and lack of temperature control. The physical wastage is one component of the inefficiency in the supply chain. There are other inefficiencies as well in terms of the deterioration in quality and the cost of intermediation in the food chain.

An efficient supply chain and distribution structure is an important means for raising the income levels of farmers on the one hand and increasing affordability of these products on the other.

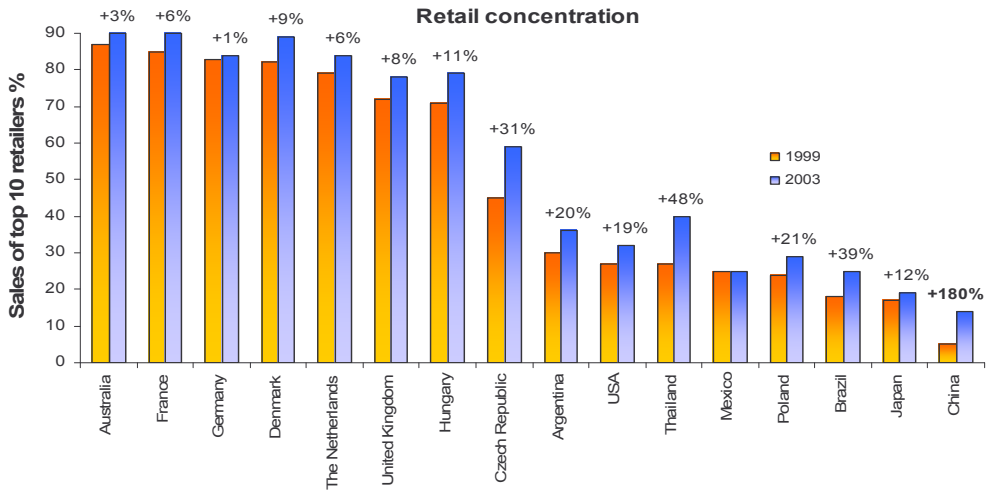
As discussed in the last chapter, the growth of the processed food industry is closely linked with retail developments. The emergence of modern formats necessitates the streamlining of the food supply chain. The agglomeration of demand gradually puts pressure on the other actors in the chain to bring in greater efficiency. Internationally, food retailers have played an important role in improving supply chain efficiencies. Most large chains have invested in disintermediation, developed storage and transportation infrastructure, trained supply chain members on food hygiene and standards, and facilitated access of the farmer to scientific know how and market information on demand, price trends etc.

3.2 Status of food distribution in India

Food accounts for the largest share of consumer spending. Food and food products account for about 48% of the value of final private consumption estimated at INR 8600 bn (2003-04 at current prices). Food products are sold through over 5 million food and grocery stores in India. The size of the organised food retail segment in India is estimated at INR 16 bn (approximately 0.2 % of food expenditure). This is in contrast to most of the developed countries, where food distribution is highly consolidated.

In countries such as Australia, France, Germany, Denmark and The Netherlands, the share of top the 10 retailers is more than 80% (USA ~ 35%, China ~ 15%).

Exhibit 3.2 A: Retail concentration



Source: Rabobank Research

Most organised retailers in India are regional and use single formats such as convenience stores, supermarkets, hypermarkets or cash and carry (a brief profile of organised food retailers is provided in Appendix 10). In contrast, most international retailers have multiple format models. Besides reflecting the stage of evolution of retailing in India, this also highlights the capital constraints of existing players in India, restricting their ability to make large investments.

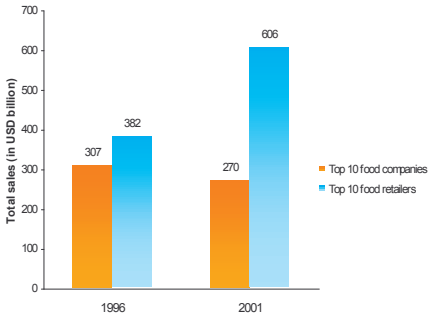
Exhibit 3.2 B: Retail formats of leading international food retailers

Retailer	Formats
Wal-Mart	Discount, Hypermarkets, Warehouse Clubs, Neighbourhood Stores, Convenience Stores
Tesco	Supermarkets, Hypermarkets, Neighbourhood stores, Convenience Stores, Internet, Catalogue, Department Stores
Carrefour	Hypermarkets, Convenience Stores, Supermarkets

Source: Rabobank International

In India, food companies are much larger in size than the organised food retailers in India. In contrast, the retailers are larger in scale, than food companies, in developed countries. Given the channel power of retailers in these markets, food companies have started establishing partnerships with them to develop and test new products, share consumer information and undertake consumer promotions.

Exhibit 3.2 C: Comparison of international food retailers and food companies



3.3 Key drivers and impediments for growth of organised food retailing

3.3.1 Key Drivers

(1) Increasing need for convenience

The Indian consumer visits about eight to ten outlets to purchase various food products which constitute the daily consumption basket. These outlets include neighbourhood kirana stores, bakeries, fruit and vegetable outlets, dairy booths and *chakkies (*small flour mills*)*. With changing lifestyles, there is growing paucity of time, and convenience in food shopping is emerging as an important driver of growth of one-stop retail formats.

(2) Availability of quality retail space

Until the late 1990s, the high cost of real estate meant that organised food retail business models were not financially viable in metropolitan areas. In the last few years, various factors have led to increased availability of real estate for organised retail formats. About 300 malls are at various stages of construction, across metros and mini-metros in the country. The average size of a mall is about 100,000 sq. ft. About 25 malls each are planned in Delhi and Mumbai, primarily in suburban and satellite areas. This will translate into additional retail space of 30 to 40 million sq. ft over the next three to five years.

3.3.2 Key Impediments

The key impediments to organised food retailing include lack of infrastructure, technology and capital.

(1) Lack of infrastructure and technology

Food distribution in India is characterised by a high degree of complexity given dispersed production on the one hand, and variance in demand across locations on the other. There is a compelling requirement for appropriate infrastructure for storage and transportation such as temperature controlled warehouses and vans. However, the limited scale of operations of retailers has restricted their investment capacity in these areas. The recent entrants who have fuelled growth of organised formats are attempting to address this issue, but given the large requirements of capital, the process of transformation is gradual. Further, entry of organised retailers, who have larger investment capacity, will also address the issue of creation of infrastructure for storage and transportation.

(2) Lack of capital

Organised food retailing is a capital intensive business with a long gestation period (typically 5-7 years). Investment is required in buying / leasing land, furniture and fixtures, IT systems, quality control systems, vendor development and infrastructure for warehousing, storage and transportation. The development of organised food retailing in India has been constrained due to

lack of capital. Foreign Direct Investment (FDI) is not allowed in retailing with the exception of cash & carry formats.

3.3.2 Impact of organised Retailing on Employment

The restriction of FDI in the retail sector is based on the premise that entry of large international players will displace existing kirana stores and impact employment. However, there is empirical evidence to suggest that development of large retail formats will translate into greater employment as witnessed in other countries such as China, Japan, Singapore and Malaysia.

The sector is labour-intensive and contributes significantly to employment. The current share of organised retailing and share of retailing in total employment is tabulated below. Higher share of organised retailing has led to higher share of retailing in total employment.

Exhibit 3.3.2 A: Share of organised retailing and Share of retailing in total employment

Country	Share of Organised Retailing (%)	Share of Retailing in Total Employment (%)
USA	80	12
UK	70	11
Brazil	40	15
Korea	35	18
Malaysia	20	7
India	2	6-7

Source: CII Study (2003), US Department of Labour, www.dti.gov.uk

In India, the share of employment of organized food retailers is insignificant, on account of the limited size of this segment at present. Traditional *kirana* outlets employ approximately 20 million people. However, there is significant shadow employment at these outlets, reflecting that the real employment potential of these outlets is far lower.

3.4 A case study - Impact of organised food retailing on the supply chain

Organised food retailing in China has increased from less than a billion dollars in 1994 to $55 billion in 2002. In the corresponding period, the number of organised retail outlets has increased from 2500 to about 53,100. Organised retailing has over a 33% share of the urban food market and 11% share of the total food retail market in China.

This development has been driven by factors which have also been observed in other developing countries (urbanization, income growth, and liberalization of foreign direct investment in retailing) as well as specific policies of the Government (government investment in the sector, and policies promoting conversion of wet markets to supermarkets).

China has followed a policy of opening up of the retail sector to foreign players in a phased manner. In China, modern retail grew at 40% after FDI was allowed in 1992. Initially, FDI was allowed only in 11 cities and the number of foreign retailers in each city was restricted. However,

these restrictions have been relaxed in the last decade. China has lifted restrictions on foreign investment in retailing, including those on foreign ownership and the number of outlets.

Exhibit 3.4.A: Development of Organised food retailing in China (1994-2002)

	Stores		Sales		
Year	Number	Annual increase %	USD Billion	Annual increase (%)	Share in total national retail of China (%)
1994	2500	-	0.38	-	0.18
1995	6000	140	0.96	167	0.38
1996	10000	66.7	3.61	275	1.21
1997	15000	50	5.06	40	1.54
1998	21000	40	12.05	138	3.43
1999	26000	23.8	18.07	50	4.82
2000	32000	23.1	26.51	47	6.5
2001	40500	26.6	37.11	40	8.2
2002	53100*	31.1	55.13	49	11.2

Source: Rabobank Research

The specific impact of growth of organized food retailing on the supply chain is as follows:

(1) Consolidation among farmers for meeting consumer requirements

Farmers benefited with increased access to output markets, inputs and credit. Farmers joined outgrower schemes started by dedicated wholesalers. They formed associations which had better capacity to supply supermarkets, with requisite volumes.

(2) Investments in infrastructure

Producers and wholesaler-run outgrower schemes have invested in greenhouses, irrigation, new packing and shipping facilities, to meet quality and consistency requirements of retailers.

(3) Increase in scale - shift towards centralized distribution centre from traditional wholesale markets

Supermarket procurement systems have begun to shift away from traditional wholesale systems towards use of large, centralized distribution centers, specialized/dedicated wholesalers operating preferred supplier systems, and private standards for quality and food safety.

The logical extension of the above trend is the regionalization and globalization of procurement systems. Several global chains have begun to implement global procurement system centers in China during the past several years. For example, the annual throughput from Wal-Mart's sourcing system hub in China exceeds $12bn. Other global chains operating in Asia have also begun to source regionally, including for fresh products. Tesco (UK) has begun to source frozen fruits and vegetables from China, for its stores in Thailand.

(4) Increase in employment

Employment in the retail sector in China has increased at about 6 % annually since 1992, from under 20 million to 52 million.

Exhibit 3.4.B: Increase in employment in retail (1990-01) in China

Source: Rabobank Research

(5) More choice and savings for consumers

Large storage facilities and bulk merchandizing led to increased sales of edible oils, noodles, condiments etc in supermarkets. Hygienic fresh products & semi-processed foods (fruits, meat products etc) were made available at wet market prices. Wal-Mart in Dalian and Hualian in Shanghai offer vegetables, chicken and fruit at wet market prices.

The consumer benefited not only in terms of greater choice but also through lower prices in organised retail formats as compared to traditional formats.

Exhibit 3.4.C: Selling Price of products (RMB)

	Traditional	Hypermarket	Savings (%)
1 Kg of rice	6.76	5.42	20
1 Ltr of cooking oil	8.7	7.88	9
1 can of Coke	2.2	1.7	24

Source: Jardine Matheson Group, 2002

(6). Government's Role

The Government's role in development of organized food retail sector in China involved four key policy measures:

- Permit entry of private sector players in retailing
- Investment by the state i.e. by the municipal governments, in supermarket chains
  The top three Chinese chains- Lianhua, Hualian, and Nonggongshang, are all managed by the municipal government of Shanghai, even though they operate as profit-oriented enterprises and compete with private firms.
- Progressive relaxation of FDI regulations for retail from 1991 to 2004
  In 1991, for the first time, FDI regulations were partially liberalized, with limited access for foreign capital in retail was allowed in China, as equity joint ventures in the six largest cities

and five special economic zones, in the eastern and southern areas. By 2002, upto 65% FDI was allowed in joint ventures. At the same time, in August 2002, FDI in wholesale and logistics was liberalized.

- Conversion of informal wet markets to supermarkets in order to modernize retail
  This policy called "nonggaichao" (literally, changing farmers markets into supermarkets) is being implemented in various large Chinese cities (Beijing, Hangzhou, Shanghai, Wuhan, Dalian, Qingdao, nine cities of Fuzhou province) over a 3-4 year period.

To conclude, the Government has played an important role in reducing inefficiencies in the supply chain. It has led to consolidation among farmers, increase in scale and employment, and more choice to the consumer.

3.5 Benefits for the Stakeholders

The emergence of organized food retail is likely to benefit the various stakeholders in the food value-chain.

Exhibit 3.5 A: Impact of emergence of organised food retailing on various stakeholders

Farmers	- Opportunities for building forward linkages / entering into contract farming arrangements - Need for consolidation / aggregation of farm produce - Increased emphasis on quality control
Intermediaries	- organised retailing leads to disintermediation. Hence intermediaries need to redefine their role in the value chain.
Processors	- Need to develop a parallel distribution channel to cater to the needs of organised formats - Improved access to information on consumption trends - Opportunities for test marketing in a more controlled environment - Opportunities for better display of products - Improved inventory management
Independent retailers	- Will co-exist with large retailers due to their inherent advantage of proximity to consumers - Need to improve customer service through better display, more choice etc
Consumers	- More choice of processed products - Increased convenience (products available under one roof) - Better shopping environment
Government	- Increased opportunities for quality employment in retailing - Access to reliable information on sales / increased tax compliance - Investment in supply chain leading to reduced wastages, improved quality control and compliance with food standards

Source: Rabobank Analysis

As seen in the case of China, the Government can play an important role in boosting the growth of organized food retailing in India. From the Government's perspective, the key concerns in allowing FDI include its likely adverse impact on the existing kirana stores and reduced bargaining power of farmers. However,

- ❖ India's retail environment is unique. There are 5 million outlets engaged in selling food and grocery products. These outlets have the advantage of proximity to consumers. Given the wide dispersion in production and consumption of food products across the country, it is unlikely that organized food retailers will be able to achieve a comprehensive nation-wide presence. Therefore, kirana stores will co-exist with large players. Further, empirical evidence suggests that the entry of large organized players has led to improved customer service and presentation of products by small retailers.

- ❖ As mentioned earlier, farmers' share in the end product price is already as low as 10% for many products. Also, the long supply chain distorts the flow of information from the farmer to the consumer. Given the fragmented nature of the food processing industry, few companies have access to capital and the ability to invest in developing forward and backward linkages. Worldwide, the investment in supply chain and quality control is driven by retailers. FDI in organized retailing can bring in the required capital and know how to disintermediate the chain, benefiting the farmer.

In order to increase the growth of processed foods, it is critical that processed products are easily available to consumers. Modern retail formats are a vital link between the processors and the consumers. It is recommended that investment in developing modern formats and modernizing the traditional retail trade should be encouraged. The action steps include:

- Promote usage of refrigerated cabinets in the kirana store, which can preserve the quality of processed foods
- Awareness programmes among traditional retailers about food safety and hygiene in the store
- Encourage institutions to develop programmes for human resources development to cater to the needs of the retail industry
- Increase availability of cost-effective credit to the retail industry
- Allow foreign direct investment in food retailing in a phased manner

Chapter 4

Exports of Agricultural and Food Products

4.1 Overview: India's position in world trade

Global food and agri exports increased from USD 326 billion in 1990 to USD 442 billion in 2002. Strong expansion in food and agri exports in the mid 1990s, was followed by a decline from 1997 to 2000. This was mainly due to a slump in prices for various agricultural commodities, on the back of demand-supply mismatches. Since 2001, food and agri trade has been growing. The main items in food and agri trade include fruits and vegetables (~USD 75 billion), cereals and cereal-based preparations (~USD 58 billion), marine products (~USD 57 billion), meat and meat-based preparations (~USD 46 billion) and beverages (~USD 40 billion).

Latin America has by far the largest agricultural trade surplus, followed by Oceania. Brazil and Argentina contribute significantly to the Latin American trade surplus. Asia has the largest trade deficit of all regions, primarily on account of Japan. Western and Eastern Europe as well as Africa have a trade deficit too.

Exhibit 4.1 A: Trade Surplus / Deficit of Key Trading countries and India (USD billion)

Countries	Exports	Imports	Trade Surplus / Deficit
Brazil	17	3	13
Netherlands	33	19	13
Australia	16	3	13
United States of America	56	45	11
Argentina	11	1	11
New Zealand	7	1	5
Thailand	8	3	5
Denmark	10	5	5
Canada	16	13	4
India	6	4	2
China	14	16	-2
Algeria	0	3	-3
Mexico	8	12	-4
Saudi Arabia	1	5	-5
Italy	17	22	-5
Korea, Republic of	2	9	-7
Russian Federation	2	9	-8
Germany	26	37	-11
United Kingdom	15	29	-14
Japan	2	34	-32

Source: FAO, Rabobank Analysis

About half of global trade flows are regionally contained, partly as a result of regional agreements and partly due to the perishable nature of agri-commodities. There has been a sharp increase in regional trade agreements (RTAs) over the past decade. A total of 259 RTAs have been notified to the WTO by the end of 2002, although only 176 RTAs are operational. An additional 70 RTAs are estimated to be operational, but not yet notified by WTO and about 70 are under negotiation. A well known example of regional trade is in the European Union, where about 75% of agricultural

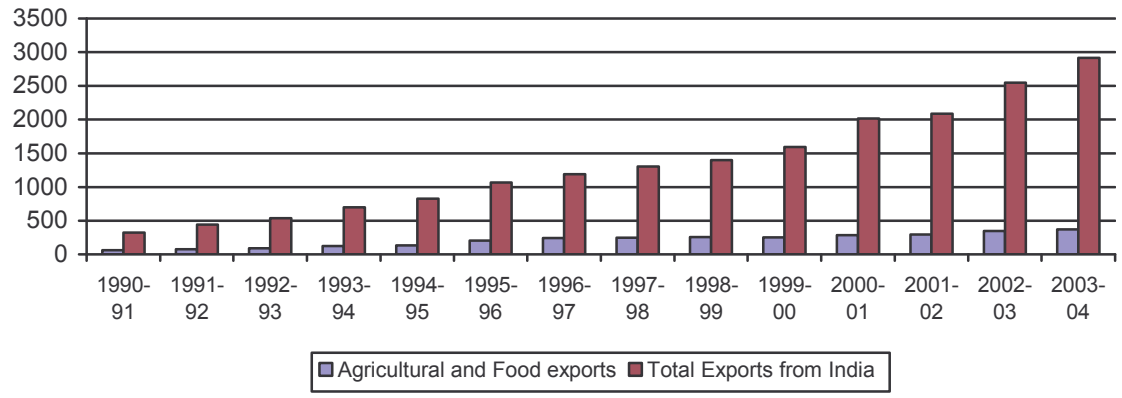
trade is within the region. The intra-regional trade figures for other regions are 33% (NAFTA), 63% (Asia) and 15% (Latin America and Africa).

The group of G-20 countries, a grouping of developing countries led by Brazil, China, India and South Africa have sought further policy reforms and market liberalization on the part of the developed world. At the Geneva meeting of the WTO, the members have agreed on a further reduction of overall trade distorting domestic support, the elimination of all forms of export subsidies and a reduction of import tariffs. The EU already anticipated this by drastically reforming the Common Agricultural Policy (CAP). Besides agricultural policies and trade arrangements, demand-supply trends and the macroeconomic environment also significantly influence trade. Another important factor is the change in currency rates.

4.2 Exports

India's exports of agricultural and food products are about INR 360 billion (approx. USD 8 billion) which constitutes about 1.3% of total global trade in food and agriculture (USD 460 billion). Exports of agriculture & food products have grown at 15% annually, vis a vis total exports which have grown at 19%, in the last decade. The share of agricultural exports as a percentage of India's total exports has decreased from 19 % to 13 % in this period.

Exhibit 4.2 A Exports: India's total vs Agricultural and Food Products (INR Bn)

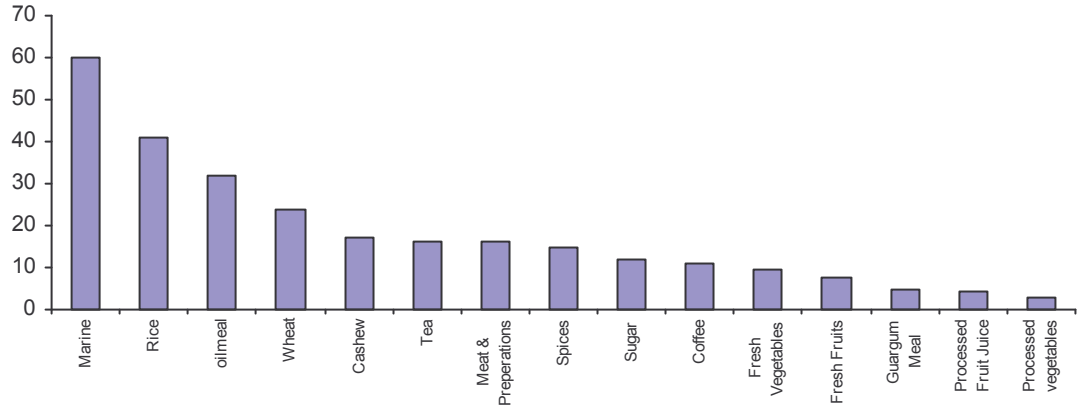


Source: Ministry of Commerce, Govt of India

Excluding non-food agricultural products (such as paper, cotton and jute), tobacco and seeds; marine exports constitute the single largest product category in agricultural and food exports from India followed by, rice oilmeals, wheat, cashew, tea and coffee. Most of the agricultural products are primary processed. Many products have shown negative or single digit growth.

The top 15 export categories in food and agricultural (except for non-food items and tobacco) from India are listed below. With the exception of buffalo meat, rice and cashew, India's share in global agricultural and food trade is insignificant. Marine products which have the highest share in Indian exports, have a 2% share of global trade in this category.

Exhibit 4.2 B: Top 15 items in India's Agricultural and Food Exports (INR billion)



Source: Ministry of Commerce

India's share in global trade for key food and agricultural products is as follows. Among the key food items, only non-basmati rice, wheat and buffalo meat has shown double-digit growth. Marine products, basmati rice and processed fruit juices / vegetables have shown single digit growth. Products like cashew, tea, spices, coffee have shown negative growth.

Exhibit 4.2 C: India's share in global agricultural and food exports for key products

	Global Exports (USD billion)	India Share (%)	India's Exports (INR billion)						
			99-00	00-01	01-02	02-03	03-04	CAGR	Key Markets*
Marine Products	56	2	51	63	58	69	61	4%	Japan, USA, EU, China
Non Basmati Rice			13	8	13	38	21	10%	South / South East Asia, Middle East, Africa
Basmati Rice	6.5	18	18	22	18	21	20	2%	Middle East, South East Asia, EU
Cashew	1.15	35	24	20	18	20	17	-7%	USA, EU
Wheat	15.4	0.02	0	4	13	18	23		South / South East Asia, Middle East
Tea	2.5	12	18	18	16	16	16	-2%	Russia, UK, Pakistan, USA, Japan, Egypt, Iraq
Spices	0.46	13	18	16	15	16	15	-4%	USA, EU
Buffalo Meat	0.29	91	8	15	12	13	16	15%	Middle East, South East Asia
Coffee	6.5	0.02	14	12	10	10	11	-5%	Italy, Germany, Russia
Processed Fruit Juices / Processed Vegetables	1.04	Neg	5	7	6	8	7	7%	Middle East, EU
Guargum			8	6	4	5	5	-9%	EU, USA

Source: FAO, Ministry of Commerce, Rabobank Analysis

*South East Asia includes Malaysia, Indonesia, Thailand, Korea, Philippines; South Asia includes Bangladesh, Sri Lanka, Nepal, Myanmar, Pakistan; Middle East includes UAE, Saudi Arabia, Yemen, Kuwait, Iraq, Iran, Qatar

Source: FAO

The market for the products listed above is becoming competitive. An indicator of this is the decreasing unit value realization (UVR) as tabulated below for rice, cashew and tea.

Exhibit 4.2 D : Unit Value Realizations for Rice, Cashew and Tea for India and Key Competing Countries (USD / MT)

	1998	1999	2000	2001	2002	Average	Growth
RICE							
India	304	383	428	322	240	335	-6%
Pakistan	288	330	265	215	273	274	-1%
Thailand	321	285	267	205	222	260	-9%
Vietnam	273	227	192	168	224	217	-5%
CASHEW							
Brazil	4472	5897	4914	3824	3491	4520	-6%
India	5103	6187	5125	4057	3251	4745	-11%
Viet Nam	4551	5965	4698	3474	3358	4409	-7%
TEA							
India	2568	2288	2149	2068	1798	2174	-9%
Kenya	2378	1868	2126	2165	1596	2027	-9%
Sri Lanka	2760	2256	2380	2317	2241	2391	-5%

Source: FAO

In summary, India has a miniscule share in a highly competitive export market and faces stiff competition even in areas where it has a strong production advantage. The significant share of raw/primary processed products in exports, renders India vulnerable to fluctuations in commodity cycles.

4.3 Imports

Against exports of approximately USD 6 bn, India's import of agricultural products are about USD 4 bn which translates into trade surplus of approximately USD 2 bn. India has abolished restrictions on imports of many agricultural and food products post liberalisation. However, tariff quotas are maintained on some edible oils, maize and milk powder. There are restrictions on imports of certain fats, oils of animal origin, and beef, based on GATT Article XX that permits countries to restrict imports on religious grounds. Some products, such as wheat, rye, oats, maize, rice, canary seed and other cereals, continue to be traded by the Food Corporation of India. Despite liberalisation of imports, India's imports are growing at about 1% per annum for the last five years.

While exports cover a wide range of products, imports are skewed towards pulses and oilseeds. Pulses and oilseeds are the key food items in India's imports (>60% share) of food items displaying year on year growth. Increasing production of edible oils in India (as discussed in Volume II) can reduce India's dependence on imports to a large extent.

Exhibit 4.3.A: India's import of food and agricultural products

Figures in '000 USD

	Year					
	1998	1999	2000	2001	2002	CAGR
Total	3,833	3,970	2,877	3,923	4,019	1%
Pulses	190	89	112	737	608	26%
Oilseeds / Oil	1,802	1,927	1,452	1,615	1,968	2%
Fruits and Vegetables	405	434	406	312	422	1%

Source: FAO

Another category which has witnessed growth in imports is Scotch whisky. The volume growth is about 13% and value growth is about 6% in the last decade. However, the growth is driven by imports of bulk Scotch, which is bottled in India and/or blended with Indian liquor by domestic manufacturers. Bottled Scotch imports have not witnessed any growth due to the current level of import duties.

4.4 Issues hindering exports

India continues to be either absent or at best a marginal player in most of the leading markets for its exports. Indian players have not succeeded in establishing direct linkages with buyers/consumers in importing countries, as a result of which a large proportion of exports are being further processed and re-exported by other countries. The sector-specific issues for key products arrived on the basis of discussions with leading exporters from India are highlighted below.

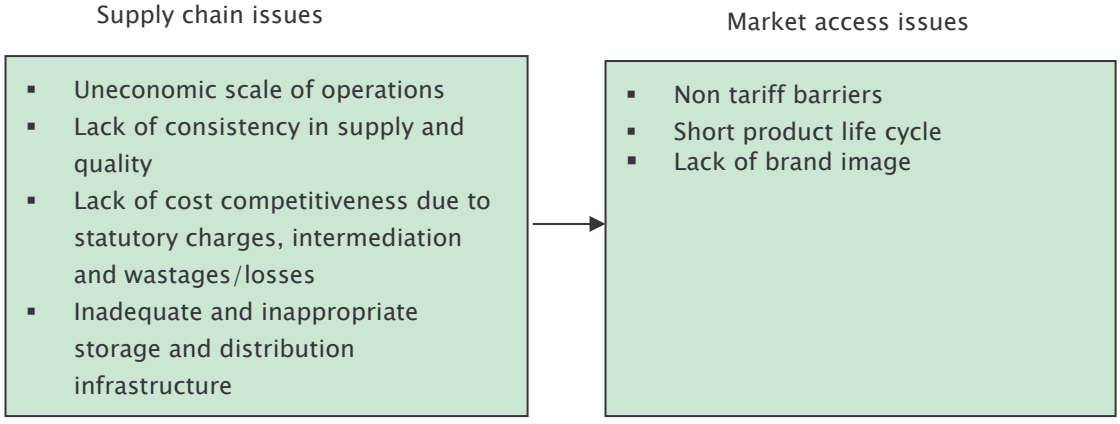
Exhibit 4.4.A: Key Issues hindering exports

Product	Key issues hindering exports
Marine products	- Decline in raw material availability - Fragmented base of suppliers - Lack of availability of technology e.g. for tuna fishing - High duties on imports of additives/flavourings for making value added products - Anti-dumping issues (such as excess use of antibiotics) in key markets
Rice	- Outdated milling technology (using rubber roll sheller) resulting in high share of broken rice - Poor quality of seeds / non-availability of certified authentic seeds leading to lack of consistency in grain quality - Low cost competitiveness due to state taxes and MSP regime (for non-basmati)
Cashew	- Lack of raw material availability - high dependence on imports of raw nuts, Interstate barriers on movement of raw nuts - Purchase tax for exports in some states (e.g. 4 % in Tamil Nadu) - Lack of mechanization of processing leading to higher production costs - Lack of established quality parameters for raw cashew
Tea	- Export market viewed as a 'residual market' to sell surplus production. - High cost of production - Production focused on CTC rather than orthodox, whereas demand for orthodox tea is growing faster than for CTC
Coffee	- Low realizations due to exports restricted to green coffee and no exports in roasted / instant / branded coffee - Export cess of INR 500/MT leading to low profitability for exporters
Buffalo meat	- Absence of policy on permitting rearing for slaughter which translates into lack of traceability – a key requirement in several importing countries - Inappropriate facilities at existing municipal slaughter houses. - License for setting up private slaughter house is difficult to obtain. - Prevalence of various diseases particularly Foot and Mouth Disease (FMD)

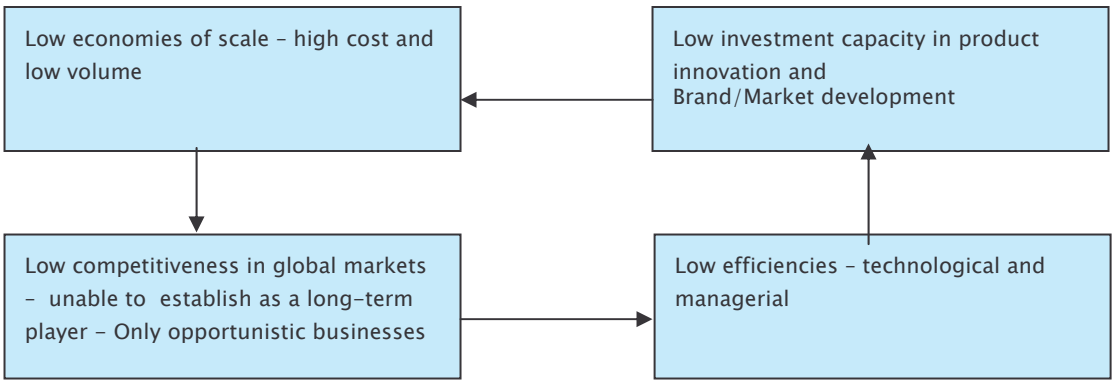
Product	Key issues hindering exports
Mango	- Lack of exportable varieties (high fibre content; inappropriate appearance and texture and large size of stone) - Lack of post-harvest treatment facilities such as for vapor treatment - Lack of packhouses from farm to port
Grapes	- High cost of setting up vineyards - High cost for obtaining certification for exports. For e.g., the cost of EurepGap certificate is INR. 75000 / farmer (including the cost of construction of separate storage space for fertilizers and pesticides etc)
Dairy products	- Lack of quality monitoring mechanism in the supply chain as required by many importing countries - Opportunistic production of SMP with low exportable surplus - Few local manufacturing facilities of value added products - Lack of appropriate packaging technology
Guar gum	- Variation in production from year to year (high share of rain-fed areas) - Increasing domestic demand from non-food applications such as textiles, paper, pharmaceuticals, oil well drilling
Poultry Products	- Lack of competitiveness due to high cost of production

Source: Rabobank Research

The issues discussed above can be categorised into "Supply chain issues"- which are inherent to the domestic supply chain for food products and "Market access issues"- which comprise of various parameters and factors driven by the requirements of the target countries.



Most exporters from India lack scale- for example the largest fresh produce exporter records annual sales of about INR500mn. The low volume translates into lack of economies in operations and makes exports uncompetitive. Hence, exporters are not able to establish themselves as long-term players in the export market, and rely heavily on opportunistic businesses. These factors cumulatively translate into low investments in upgrading skill sets, product innovation, quality improvement and brand building.



Countries across the world have successfully addressed these issues to become globally competitive.

4.5 Export strategies of competing countries

Exhibit 4.5.A: Case studies of strategies of competing exporters

Country	Products	Focus
Vietnam	Rice	Competitiveness through increased productivity
	Cashew	Mechanization of processing technology
	Coffee	Government support
Thailand	Tuna	Market and product development
Kenya	Tea	Diversification into new markets / Development of domestic market
Brazil	Animal Protein, Coffee, Sugar and Confectionery	Farmer processor linkages and operational efficiencies

4.5.1 Rice, Cashew and Coffee exports from Vietnam

(1) Rice –Increased competitiveness through higher productivity

High competitiveness in rice has been achieved on the back of consistent increase in area and productivity for paddy. Cropping patterns have been adjusted to increase land area for planting winter-spring paddy and summer-autumn paddy (from 2.1 and 1.2 million ha in 1990 to 2.89 and 2.35 million ha in 2000 respectively) and reducing acreage under low – yielding winter paddy (from 2.74 to 2.4 million ha).

Intensive farming and more advanced technologies have led to a consistent increase in paddy yields from 3.69 tons/ha in 1995 to 4.6 tons/ha in 2003; higher than other Asian countries including India (2 tons /ha), Thailand (2.2 tons/ha), Myanmar (3.2 tons/ha) and the Philippines (2.89 tons/ha).

These measures have facilitated the increase in output from 19.2 million tons in 1990 to 31.3 million tons in 1999, and further to 34.4 million tons in 2003.

(2) Cashew – Mechanization of processing technology

Vietnam is the largest cashew producer in South East Asia and the third largest cashew exporter in the world after India and Brazil. Over 90% of production is exported. The number of cashew exporters have increased from 16 in 1997, to over 50 in 2003.

The cashew processing industry in Vietnam has made significant contributions to enhance exports. The developments in processing technology have enabled Vietnam to export cashew in processed form. Vietnam has developed "Cover split technology" designed by Vietnamese technicians. This technology is cheap and is able to generate a higher ratio of whole seed. Due to easy availability of efficient technology, the number of processing companies increased from 6 in 1986 to 30 in 1994 (with total capacity of 75000 tons/year) and to 62 in 1999 (with total capacity of 250000 tons/year) to about 120 in 2003.

(3) Coffee – Government Support

Vietnam is ranked as the second largest coffee exporter in the world since 2000, next to Brazil. It exports coffee to about 62 countries. The two largest markets include the European Union (47 % share) and the USA (15 % share). The Government has played an important role in increasing coffee exports. Some of the initiatives include:

- Inviting foreign investment in production and trading of coffee – many of the world's largest trading houses in the world such as ED & F Man, Newman Groupe and O Lam are present in Vietnam
- Promoted application of international standards to domestic coffee.
- In order to cope with the market changes, the Government and industry bodies carried out studies to determine the appropriate proportion of Robusta and Arabica to be cultivated in line with global demand. Accordingly, Robusta plantations were replaced by Arabica. The aim is to achieve a proportion of Arabica and Robusta as 75:25, to align it with global demand.

4.5.2 Tuna from Thailand – Market and product development

Thailand is the world's largest producer, and second largest exporter of canned tuna. 90% of Thai tuna production is exported, bulk of it having been imported from other countries in raw form. The export value of Thai canned Tuna doubled in the last ten years to about THB 30,000 million (USD 670 million). Canned tuna from Thailand faced severe competition in its key markets viz the USA and the EU in 2002. Both the USA and the EU have allowed duty-free access to canned tuna from Andean countries. Further, the EU has also provided duty free access to the ACP (African, Caribbean and Pacific) countries. The duty rates imposed on tuna by the USA, the EU and Japan are tabulated below:

Exhibit 4.5.2.A: Tariff rates for canned tuna

	USA	EU	Japan
Thailand	6%	24%	6.4%
ACP	n.a.	0%	n.a.
Andean	0%	0%	6.4%

Source: Rabobank Research

These trade barriers made Thai canned tuna products less competitive. In order to maintain its leadership position in canned tuna, the Thai industry adopted the following strategy:

Exhibit 4.5.2.B:

Challenges	Strategy
Raw material Dependence on imported supply and fluctuations in world prices of tuna and tin	- Diversify base of suppliers - Financial instruments to mitigate the risk of fluctuations
Trade - Trade barriers – import quota, tariff - Non-trade barriers – environmental concerns, GMO issues, food labeling and safety	- Develop new export markets (China, India) - High quality production processes and safety measures (for e.g. canneries shifted to sunflower oil after genetically modified soyabean oil was banned by some importing countries)
Competition - Competition from ACP and Andean countries	- Partnership with global tuna companies - diversification into other food businesses such as pet food, fish oil to safeguard against cyclicality - Development of domestic market for canned tuna
Substitute products -Threat from other seafood products and other animal protein products	- Product development e.g. tuna-based ready to eat, processed foods and snacks

Source: Rabobank Research

This strategy enabled Thailand to maintain its leadership position in tuna exports.

4.5.3 Tea export from Kenya – Diversification into new markets / Development of domestic markets

The key markets for Kenyan tea are Pakistan, UK, Egypt, Afghanistan and Russia. In the recent past, two important markets- the UK and Egypt, reduced imports of tea from Kenya. The Kenyan Tea board decided to broad base its markets and started promotion activities targeting new markets such as West Africa, Eastern Europe and the Middle East. The Board is involved in both domestic and international generic promotion of Kenya tea through participation in Fairs, Symposiums, Seminars etc.

A sustained generic promotion campaign was launched by the Kenyan Tea Board in October 2002 to popularise tea-drinking in the country. The above efforts have contributed significantly to growth in demand in the local market – tea sales grew by 14% to 14.4 million MT in 2003 after declining for 10 years. The campaign, in its second year, spurred renewed brand promotions by various packers to ride on the increasing tea and health awareness created by the Board throughout the country. The Generic Tea Promotion Campaign aims at increasing the local per capita consumption from the current 500g to 805g in the next five years. This will reduce Kenya's dependence on overseas markets.

4.5.4 Brazil – Direct farmer processor linkages and operational efficiency

Brazil is an outstanding success story in agri and food exports, having achieved leadership status in a wide range of agri products including sugar, orange juice, meat, oilseeds etc. Brazil's agricultural and food exports constitute 34% of total exports from the country, and are valued at USD 25 billion. The key underlying factors which have enabled Brazil to achieve the above are as follows:

- Direct farmer processor linkages: This has had multi-fold benefits including enabling processors to achieve scale in operations which has led to development of sustainable business models, ensuring farmers adopt best practices to enhance crop productivity and availability of financing to growers, on the back of firm offtake arrangements with processors

- The other key enabler is the free market system which has ensured that processors and farmers aim to maximize operational efficiencies. For e.g. one ton of sugarcane produces 140 Kg of Sugar (vis a vis 100 kg in India, 85 kg in Argentina) in Brazil which is among the highest in the world.

4.6 Vision, Strategy and Action Plan

4.6.1 Vision:

India has the potential to achieve a 3 % share in world trade of agricultural and food products by 2015. India should aim to garner 2% share of world exports by 2010 and 3% share by 2015. This implies annual growth rate of 11 % till 2010 and 8% annual growth from 2010 to 2015 as tabulated below:

Exhibit 4.6.1.A: Current and Projected Exports of Agricultural and Food Products

Year	World Exports*	India's Exports	India's Share	Growth Rate
2002-03	442	6	1.24%	-
2010	512	12	2.25%	11%
2015	569	17	3.00%	8%

*World exports for 2010 and 2015 are projected on the basis of CAGR of 2.1% for the 10 year period (1992-2002)

4.6.2 Strategy:

In order to sustain the momentum of penetrating new markets without losing share in existing markets, it is important to focus on key markets, which offer high growth potential and products where India has an inherent production advantage.

(1) Product Market Focus

As highlighted in the above case studies, "focus" and "long-term strategy" are the cornerstones for sustainable success in agriculture & food exports. It is recommended that the following products/markets be focused on, in the initial phase. These product categories have been identified on the basis of one or more of the following parameters

- India's production advantage (in aggregate terms or for specific varieties)
- Current and likely trade volumes in the category, based on underlying demand trends
- Potential for differentiation
- Comparative cost advantages

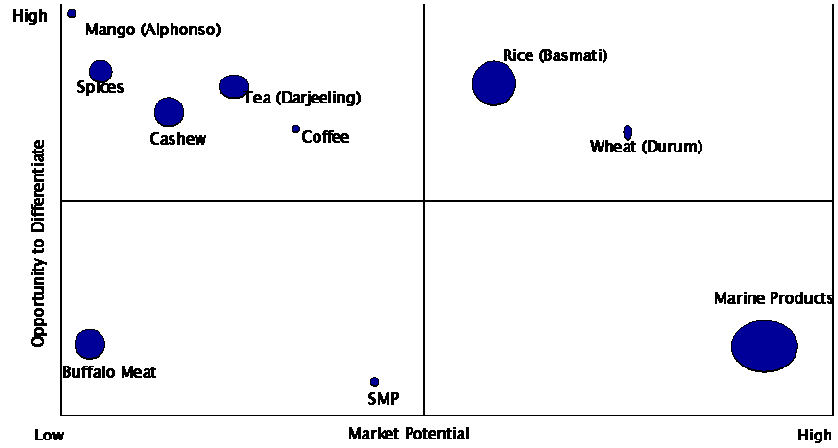
Exhibit: 4.6.2.A Product Market Focus

	USA	EU	Middle East	South East Asia	South Asia	Africa	CIS
Marine Products							
Non Basmati Rice							
Basmati Rice							
Cashew							
Wheat							
Tea							
Spices							
Buffalo Meat							
Coffee							
Vegetables							
Guargum							
Mango Pulp							
Cereal preparations							
Confectionery							
Dairy Products							

(2) Product Segmentation

India's exports of food and agricultural products can be categorised on the basis of market potential and the opportunity to differentiate the product offering.

Exhibit: 4.6.2.B: Market Potential and opportunity to differentiate for Indian Exports



*Market potential is current size of world trade, the size of the circle denotes India's current exports for the category, relative to total exports, varieties which can aid differentiation are mentioned in parentheses

The opportunity to differentiate emanates from inherent production advantages on account of low cost production and/or availability of unique varieties. For instance, India has unique varieties such as Durum wheat, Darjeeling tea, Alphonso Mango which can be leveraged effectively to establish a significant presence in exports, both in terms of absolute value as well as market share. On the other hand, in dairy, India has significant cost advantages, which can render it a significant exporter, (provided quality challenges are addressed) especially in view of declining subsidies in the EU.

(3) Improvement in market access

Two key steps for improving market access of Indian food products in overseas market is to institutionalize the market intelligence network for exporters and harmonization with international standards and develop associated infrastructure for certification and testing

A. Market Intelligence

In order to focus on some key products and markets, it is critical to develop a strong database to enable current and potential exports to take rational decisions. The key information needs of exporters include:

- Major importing markets
- India's competitiveness vis a vis key competitors
- Existing tariff structure and non tariff barriers, and likely changes in the context of WTO requirements
- Current status of quality standards and food regulations in target markets for imports of identified products

As discussed in Chapter 8, a special cell needs to be set up by the Ministry of Food Processing which provides requisite information on the above aspects to exporters.

B. Harmonisation with international standards / practices, certification and testing

One of the major challenges for India, following the dismantling of quantitative restrictions on imports, is to raise the level of quality standards to become globally competitive. There are variation in standards and regulations adopted by different importing countries, which may lead to trade conflicts and disputes.

The specific steps in this direction are:

- Substitute post arrival testing of Indian products in the importing country with pre-shipment inspection reports by recognized international agencies.
- Expansion of the list of export products for certification by EIC (Currently, EIC certifies six notified commodities viz. Basmati rice, Black pepper, Egg products, Honey, Fish products and Milk products)
- Encourage importing countries (primarily USA, EU, Japan) to set up offices in India for certification of export consignments
- Encourage food testing laboratories in India to obtain accreditation from international agencies. Given high cost of international accreditation, Government can incentivise laboratories by part funding these costs.
- Introduce certification zoning systems – pesticide free zones, organic production zones, disease free zones to facilitate high value exports from India
- Promote certification for organic farming for different crops.

(4) Supply chain alignment with international requirements

The supply chain needs to be aligned with the requirements of importing countries which require control and monitoring of quality standards of the raw material and processed products. The specific action steps to facilitate this are:

- Enable direct farmer-processor linkages by amendment of the APMC Act

- Set-up independent world-class food testing and inspection infrastructure, particularly in clusters with significant presence of exporters (refer to Chapter 6 on Food safety and Hygiene)
- Devise an alternate system of processing-grade product specifications based on internationally accepted norms, delinked from fair average quality of table grade products.
- Encourage investment in infrastructure to improve product quality, through part-funding these investments, such as financing of bulk coolers
- Support private sector initiatives for investing in specialized transport infrastructure such as reefer vans through specific financing schemes for this purpose

(5) Integration of Government Schemes

The Government, through various Ministries and allied agencies, offers support to exporters through various schemes to part-finance specific investment requirements . The Ministries/allied agencies include Ministry of Agriculture, Ministry of Food Processing, APEDA, MPEDA, Coffee Board, Tea Board, Export Inspection Council etc. It is essential to align the various offerings of the Government, to address various requirements of exporters and avoid duplication of efforts.

Supply chain issues have been identified as a key constraining factor for exports. The current approach to supporting food/agri exports, through isolated schemes operated by various Ministries/Departments of the Government has not been able to address bottlenecks to exports in an effective manner. There are significant overlaps, while at the same time several need gaps which have not been addressed. Further, the quantum of assistance has a low ceiling, which is one of the factors which contributes to small scale of operations of exporters.

Exhibit 4.6.3: Activities under schemes of Ministries and Departments related to Agriculture

Vale chain	Sub-Group	Activity	APEDA	MoFPI	MoA	NHB	NCDC
Pre Harvest Management	Input Management	Credit			✓		
		Planting Material			✓		
		Seeds			✓		
		Water			✓		
		Fertilizer			✓		
		Micro Nutrients			✓		
		Implements				✓	
	Technology	Research	✓				
		Documentation				✓	
		Extension		✓	✓	✓	
Post Harvest Management	Grading						
	Sorting						
	Storage			✓		✓	✓
	Processing	General	✓	✓	✓		✓
		R & D	✓	✓		✓	
		Inputs		✓			
		Import Facilitation					
		Equipments			✓		
		Credit		✓			
	Packaging		✓				
	Transportation						✓
	Quality Assessment		✓	✓			
Marketing	Market analysis		✓	✓		✓	
	Marketing Assistance		✓	✓	✓		✓

Source: Government Publications, Rabobank

4.7 Action Plan

The action plan is stated below:

- Integrate all schemes offered for export promotion through various Ministries and allied agencies such as APEDA, MPEDA, Coffee Board, Tea Board, Export Inspection Council, Ministry of Agriculture, Ministry of Food Processing etc. under one body.
- Strengthen food processing infrastructure in AEZs
- Encourage food testing laboratories in India to get accreditation from international agencies.
- Set-up independent world-class food testing and inspection infrastructure, particularly in clusters, with significant presence of exporters
- Devise an alternate system of processing grade product specifications based on internationally accepted norms.
- Promote aggregation of exports to meet the minimum order requirement of importers
- Expand the list of export products for certification by EIC
- Develop a strong market intelligence system to aid exporters to take rational decisions.
- Introduce certification zoning systems – pesticide-free zones, organic production zones, disease free zones to facilitate high value exports from India
- Promote certification for organic farming for different crops
- Build global brands on the back of India's strengths (Darjeeling tea, Basmati rice, Durum wheat, Alphonso mango)

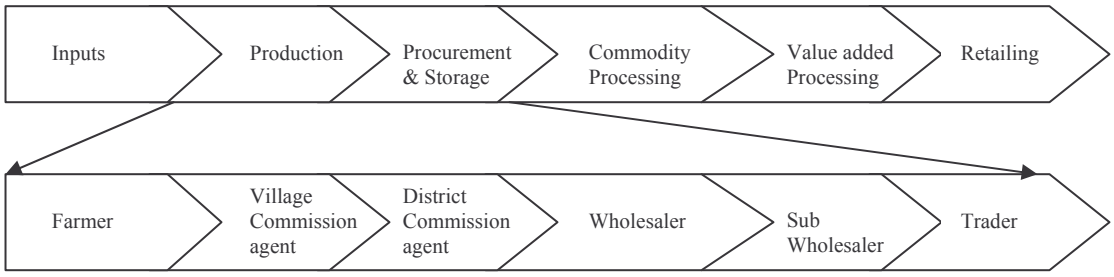
Chapter 5
Finance for Food Processing Sector

5.1. Financing needs of the agricultural and food supply chain

The Indian agribusiness supply chain is highly fragmented, with independent players engaged in various value-addition activities such as input supplies, cultivation, processing, distribution, storage and retailing. The scale of operations of each entity is limited not only due to the structure of the supply chain, but also on account of Government policies as well as due to demand-related factors.

In contrast, internationally, a large number of food companies are integrated across the chain. e.g. players such as ADM and Cargill have business interests in agricultural inputs, procurement, transportation and storage of produce, processing and value addition.

Exhibit 5.1.A: Agri Supply Chain



Source: Rabobank Research

The structural complexion of the Indian supply chain thus translates into limited scale of financing as well as higher risk, given the lack of control of each of the players, on the supply chain.

5.1.1 Issues with farmer financing

It is important to understand the issues faced in farmer level financing, both from the borrower's as well as the lender's perspective, and develop solutions which address these issues comprehensively.

(1) Farmer's perspective – Limited access to credit

- **Non-availability of timely credit from organized sources**, mainly on account of the processes and procedures of banks/financial institutions. This compels farmers to rely on intermediaries.
- **Inadequacy in credit availability** – The 'scale of finance' method, stipulated by RBI, caps total credit availability per farmer.
- **Inability to offer tangible security/ collateral cover to access credit from banks** – Subsistence farmers, who constitute a large proportion of India's farming community, are unable to

benefit from the organized credit system since they cannot offer adequate tangible security. Further, the security offered (land documents) are notional and cannot be enforced by banks.

- The above factors, thus translate into continued reliance on intermediaries for financing. While intermediary financing is timely, as they do not require the level of documentation as banks, the cost of funds is exorbitant, nearly 4 times that of interest rates charged by banks.

A more efficient agri-supply chain requires that farmers' financing needs are addressed by banks and linkages of farmers with middlemen are scrapped.

(2) Banker's perspective

- **Lack of credit discipline among borrowers** Lack of credit discipline, to some extent is infused by the Government's decision to waive outstanding loans of farmers. Policy-related uncertainties translate into a huge risk for banks. Instead of loan waivers, the Government should seek to impose a short-term moratorium on repayments, to enable farmers to overcome the adverse impact of a poor monsoon/crop failure.
- **Lack of tangible security from farmers-** as mentioned above, farmers are unable to provide tangible security to financiers.
- **Lack of linkages of farmers with processors-** In absence of forward linkages with markets, banks run a huge performance risk, as there is greater potential for farmer default.
- **Inadequate insurance cover** – the existing crop insurance schemes are inadequate, and this further increases the risk profile of farmers
- **Norms for priority sector lending**- As per the current RBI policy on priority sector lending, kharif credit is not accounted for in priority sector lending. This results in a lop-sided focus on extending financing to farmers, favouring crops cultivated in the rabi season.

A. Policy-related issues

- **Cooperatives Act**: There are about 95,000 Primary Agriculture Credit Co-operatives (PACS) and about 100,000 marketing co-operatives. As per the Cooperative Act, cooperatives are allowed to borrow from Cooperative Banks, DCCBs and RRBs. This provision needs to be extended to scheduled banks, in order to enhance flow of credit to farmers.
- **State Warehousing Corporations Act** Private sector scheduled banks are constrained from lending to State Warehousing Corporations. Given the sizeable investment required to create grain storage infrastructure, it would be in the interest of the CWC /SWCs that a wider participation of lenders is permitted.
- **Restrictions on land holdings**: The State Land Holding Laws prohibit consolidation of land holdings. Financing to farmers with larger land holdings, and thus larger scale of operations, could result in higher credit flows from banks. Further, the Government could also consider consolidation of wastelands and leasing of these to corporates. This would not only enable increase in financing to agriculture, but also aid crop diversification.

5.1.2 Financing – food processing sector

The food processing sector comprises a large number of small and medium sized companies, a significant proportion of which have stand alone operations, with no control over the raw material base and reliant on other organizations to undertake marketing/further processing of their products. Banks and financial Institutions adopt the same risk models relevant to the manufacturing sector, for assessing food processing companies. Interest charges for food

processing companies are high, on account of the high risk perception associated with the nature of their operations.

A. Key issues in financing: Food Processors' perspective

- With raw material availability often being seasonal, and/or concentration in demand, inventory holdings are high and thus the working capital finance issued through normal Maximum Permissible Bank Finance[6] method does not address the funding requirements adequately.
  The rate of interest for working capital assistance is high. Most food processing companies are not able to access adequate working capital at reasonable rates. This affects the raw material procurement and capacity utilization through out the year. Unavailability of large working capital facilities, or facilities without a high seasonal drawal, restricts players in purchasing agri produce in large volumes, when prices are favourable.

B. Key issues in financing food processors: Banker's perspective

- Lack of reliable information on demand-supply, price trends, raw material supplies etc is a significant constraint for banks, impacting credit assessment and monitoring
- High operational / transaction cost in servicing small companies
- Lack of backward linkages for assured access to raw material
- Lack of forward linkages of stand-alone food processing units for marketing/distribution

Owing to high cost of market development, the profitability of food processing companies is under pressure in the initial years of their operation. This impacts the risk rating and leads to high cost of borrowing. Even temporary adversities in market conditions can lead to defaults and eventually the loan can become a non performing asset for banks.

5.2. Sources of finance for agriculture & food processing

5.2.1 Sources of finance for Agriculture

At present nearly 60% of rural credit is used for agriculture and allied activities, 10% for non-farm activities and the balance 30% for funding household consumption expenditure. Nearly 40 – 45% of rural credit needs are catered to by formal credit institutions and the balance by the informal sector including commission agents, input suppliers, traders, Self Help Groups (Joint Liability Groups), processing industries and professional money lenders. The institutional structure for lending to the agriculture sector is in Appendix 11.

The aggregate financing to the rural credit segment, from organized sources, in 2002-2003 for agriculture and allied activities, stood at INR 696 billion against the projected quantum of INR 821 billion, (84.8% target achieved).

Exhibit 5.2.1.A: Entity-wise Credit Flow for Agriculture and Allied Activities (INR Billion)

Agency	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03*
Co-operative Banks	140.85	159.57	182.60	207.18	235.24	236.36
Regional Rural Banks	20.40	24.60	31.72	42.20	48.54	60.70
Commercial Banks	158.31	184.43	247.33	278.07	335.87	397.74
Other Agencies	-	-	1.03	0.82	0.80	0.80

[6] Maximum Permissible Bank Finance is a method of estimation of working capital requirements of borrowers. Banks can decide these limits for a processor, based on the level of current assets and current liabilities.

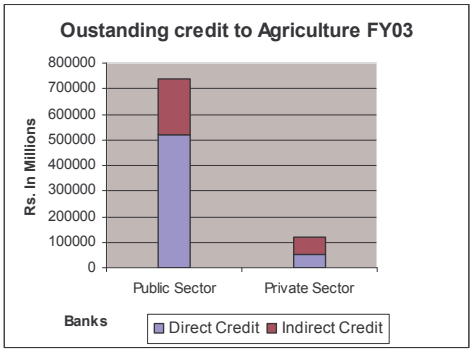
Total	**319.56**	**368.60**	**462.68**	**528.27**	**620.45**	**695.60**

Source: NABARD Annual Report, 2002-03 *Vyas Committee report RBI

The Indian commercial banks are mandated by the Reserve Bank of India (RBI), to undertake directed lending for agriculture and rural development. Commercial banks are required to achieve priority sector lending of 40% of net bank credit of which **18% should be for agriculture**. Further, sub-targets are also specified ie **Direct Agriculture**[7] (credit for direct farmer benefit, **Target: Minimum of 13.5%** of the net bank credit) and **Indirect Agriculture**[8] (Target: **Maximum of 4.5% of the net bank credit**).

In FY 03, total agricultural advances outstanding under priority sector lending, by Public Sector Banks stood at INR 735 billion, on a total net bank credit portfolio of INR 4779 billion. As compared to this, agricultural advances by Private Sector Banks stood at INR 119 billion, on a total net bank credit portfolio of INR 718 billion. The following Exhibit provides details of direct and indirect priority sector credit amongst Public and Private sector banks during FY03.

Exhibit 5.2.1.B: Outstanding credit to Agriculture 2003



Source: RBI

The FY03 data reveals that 87% of Banks have failed to achieve priority sector targets, of which 81% are public sector banks and 93% are private sector banks.

Exhibit 5.2.1.C: Number of banks which achieved the 18% target

As on the last reporting Friday	Public sector banks		Private sector banks	
	Achieved the 18% target	Did not achieve the 18% target	Achieved the 18% target	Did not achieve the 18% target
March 2001	4	23	1	30
March 2002	6	21	2	29
March 2003	5	22	2	27

Source – RPCD, RBI

[7] Direct Lending to Agriculture: refers to any credit which is provided to the farmers for cultivation purposes.

[8] Indirect Lending – includes credit provided 'indirectly' to the agriculture sector such as for creation of rural infrastructure, input supplies, support services for agriculture, marketing etc.

In case of a shortfall in lending to agriculture, banks are required to invest in Rural Infrastructure Development Fund (RIDF[9]) deposits, which offers interest rates linked to the bank's performance in lending to agriculture. These rates are inversely proportional to the shortfall in agricultural lending. The interest rate on RIDF is provided in slabs, based on the achievement of the priority sector lending target, and can be as low as 4% to 5%. Therefore, it is imperative to achieve the agriculture target and more specifically the Direct Agriculture target as it accounts for 75% of the total.

5.2.2 Source of Finance to Food Processing

- Banks: The Food Processing sector has access to credit from Commercial Banks- Indian and Foreign, Cooperative Banks and the Regional Rural Banks. The formal institutional sector assists the food processing companies through long term loans for capital investments and short term loans for working capital. The total lending to the food processing sector is clubbed with lending to the agriculture sector and separate details for financing to the food processing sector are not available.

- National Bank for Agricultural and Rural Development (NABARD): NABARD offers refinance facilities for food processing, agri infrastructure, developmental assistance for RRBs, DCCBs, SSI and SHG linkages, and assists in infrastructure development and research.

- Small Industries Development Bank of India (SIDBI): SIDBI has been involved in assisting the entire SSI Sector including tiny, village and cottage industries through suitable schemes tailored to address the funding requirements for expansion, diversification, modernisation and rehabilitation.

- Export Import Bank (EXIM Bank): Exim Bank assists in financing and facilitation of foreign trade. The Bank also offers financial support to companies engaged in exports.

- National Cooperative Development Corporation (NCDC): NCDC assists in promotion, planning and financing the agricultural supply chain from production, processing, storage and trade of agricultural produce and food products. NCDC also provides assistance for marketing of certain notified commodities e.g. fertilizers, pesticides, agricultural machinery etc.

- Ministries / Government bodies

➢ Ministry of Food Processing Industries (MFPI): MFPI is the Nodal agency for development of the processed food sector in the country MFPI's financial schemes include schemes for technology upgradation, Human resource development, Quality testing, R&D, TQM, backward and forward integration, development of infrastructure including food parks.

[9] Established in 1996, RIDF is being utilized for making investments in rural infrastructure projects. Nine tranches of RIDF have been established with an aggregate corpus of INR 340 billion, with the ninth tranche of INR 55 billion. Cumulative sanctions and disbursements under various tranches of RIDF stood at INR 334 billion and INR 193 billion respectively, at the end of February 2004. The RIDF funds are used to finance minor irrigation projects, shallow wells, drinking water facilities, roads, bridges and storage infrastructure.

- Agricultural and Processed Foods Products Export Development Authority (APEDA): APEDA facilitates market linkages between Indian producers, manufacturers and the international market. APEDA provides financial assistance for market development, infrastructure development and development of quality enhancing facilities.
- Ministry of Agriculture (MoA), Government of India: The Ministry of Agriculture under various schemes, provides financial assistance for development of specific crops for investment in seeds, irrigation, farm implements, inputs, infrastructure and training.
- National Horticultural Board (NHB): NHB promotes integrated development in horticulture, assists in development of post harvest management infrastructure, promotes production and processing of fruits and vegetables, strengthening of market information systems and assists in R&D programs in cultivation and processing. NHB's financial schemes are directed towards commercial horticulture and infrastructure related to post harvest techniques

Financial assistance from these organizations are in the form of grants, back-ended subsidies, soft loans, refinance etc., with most of the schemes directed to specific sub-sectors of the agri/food processing industry. In addition, some State Governments offer financial schemes to companies in the sector.

The key issues with Government schemes are highlighted below:

- Overlap among schemes

Various Government agencies have separate schemes which aim to achieve the same objectives. Thus, an applicant can potentially approach different agencies and obtain assistance from more than one agency. Some of the examples of overlapping schemes are as follows:

Exhibit 5.2.2A: Schemes related to cold storages

Scheme	Implementing Agency	Pattern for disbursement	Budget (INR million)
Schemes on packaging centre / integrated cold chain facilities and value-added centres	Ministry of Food Processing Industries	25% of the total cost of plant and machinery (33.3 % in backward areas) subject to a ceiling of INR 20 million	340
Scheme for infrastructure development (setting up of specialised storage facilities such as high humidity cold storage deep freezers, controlled or modified atmosphere)	APEDA	25% of the cost subject to ceiling of INR 1 million	306.7
Scheme for induction of new technology / modernization of seafood industry	MPEDA	25% of the cost of construction subject to ceiling of INR 6 million	218.7
Capital investment subsidy scheme for construction / expansion/ modernisation of cold storage for horticulture produce	NHB	25% back-ended capital investment subsidy subject to ceiling of INR 5 million (33.% up to 6 million in North Eastern states	400

Exhibit 5.2.2.B: Scheme for modernization / technology upgradation

Scheme	Implementing Agency	Pattern for disbursement	Budget (INR million)
Setting up / expansion / modernization of food processing industries (f & v, milk, meat, poultry, fisheries, cereals, pulses, oilseeds, other horticultural sectors) leading to value addition and shelf-life enhancement	Ministry of Food Processing Industries	25% of the total cost of plant and machinery subject to a ceiling of INR 5 million in General Areas (33.3 % and ceiling of 7.5 million in Difficult Areas)	350
Induction of new technology /	MPEDA	25% of the cost of plant and machinery with	218

modernization of seafood industry		ceilings specifics to equipments	
Development of commercial horticulture through production and post harvest management	NHB	Back ended capital investment subsidy @ 20% not exceeding INR 2.5 million	350

- Several areas addressed inadequately: There are a host of areas which are not addressed by these schemes such as financing of freezer cabinets for retail outlets, financing of bulk coolers for milk, financing of alternate markets/mandis, financing of vending machines for tea/coffee/beverages etc.

- Creation of excess capacity: There are instances where assistance has been provided to set up cold storages in locations which have excess storage capacity. This has lead to an unviable situation for all cold storage operators in the region. It is essential for the nodal agencies to achieve development of the food processing sector in a sustainable manner.

- Inadequate financial assistance: In most instances, there is a cap on total financial assistance provided at INR 5-5.5 mn. This leads to fragmentation in capacity creation, and often, a situation of overcapacity. At the same time, it does not allow players to scale up their operations.

- Inadequate Monitoring of progress of schemes: It is important to track progress of the projects funded by the Government. Periodic appraisal of the progress will ensure that funds are appropriately utilized. This will also enable assessment of success and lacunae of these schemes and record the multiplier effect of the financial support provided.

- Most of the schemes are back-ended which leads to a funds crunch during implementation.

- Institutions providing subsidies do not undertake their own assessment and rely on the appraisal report of the bank which provides loans to the project.

- There are significant time lags from the date of application for financial assistance, to release of funds, and may affect the project schedule, and lead to cost overruns

- These schemes do not address working capital requirements, which due to the nature of the industry, are significant and often higher in terms of quantum than capital investment requirements

- Applicants claim that they are often unaware that their applications have been rejected on account of lack of communication from the funding institution. Further, applicants are unaware of the reasons for rejection.

5.3 Solution Themes for increasing Financing to Agriculture and Food Processing

In order to improve the funding from the institutional set-up to agriculture and food processing, the following policy changes are required:

A. Redefine role of Regional Rural Banks (RRBs)

The RRB Act needs to be amended to permit RRBs to close branches and allow merger/amalgamation of RRBs among themselves or with the sponsor banks to take advantage of operational synergies. The capital structure of the RRBs also needs to be revised since state governments have been unwilling to inject their share of capital in past recapitalization exercises. The government may permit sponsor banks to increase their stake in the RRBs or bring in new investors. With this reorientation, RRBs can be effectively utilized by banks and Financial Institutions as channels for rural lending.

B. Amendments in Priority sector Lending

a. **Definition of priority sector**: In a recent circular, Reserve Bank of India has imposed a cap on investment in plant and machinery upto INR 50 million for food processing industries for classification under the priority sector. As mentioned in earlier sections of the report, as also detailed in subsequent sectoral sections, for Indian food companies to compete effectively, the policy environment needs to address all bottlenecks hindering scale of operations, and availability of financing features high on this list.

   All food processing units should be classified as priority sector irrespective of size. Relaxation of the cap on investment for classification as priority sector would provide the required fillip for flow of credit to the agribusiness sector and would also have a beneficial impact on farmers.

   Further, the scope of priority sector lending should be increased to include all primary processors of agriculture produce under 'priority sector' category, including sugar manufacturing units, rice mills, dal mills etc.

b. **Farmer financing against warehousing of agricultural produce**: Priority sector norms stipulate a cap on advances against warehouse receipts of produce upto INR 0.5 million. The norm also stipulates the advance to be exclusive to farmers availing a crop loan with the same Bank. This cap on the quantum of borrowing should be removed. Further, the advance should be delinked from the crop loan. This will encourage farmers to store their produce during the peak season and sell it during the lean period, to obtain better prices for their produce. The current system forces the farmer to sell all his produce immediately after harvest to traders/ commission agents, who store the produce and profit due to price fluctuations.

c. **Financing for high value crops**: Cultivation of crops such as grapes requires high upfront investments, estimated at INR 0.8 – 1.0 million per acre for establishing of vineyards. The cap on farmer loans for a maximum amount of INR 0.5 million per farmer restricts bank finance. This cap

on farmer loans should be made category/crop specific, taking into account the respective cultivation and investment expenses.

d. At present, banks typically provide financial assistance through loans for a period of 3-4 years. However, infrastructure such as temperature controlled storage have a longer gestation period. There should be a specific focus on encouraging banks to provide long term loans for a period of 5-7 years, which should be classified as direct agriculture lending.

e. Lending to agriculture is usually dictated by the scale of finance method of assessment of the credit requirement. This system is outdated as the norms are not based on current costs of cultivation. Banks need to assess credit needs of farmers based on current cultivation costs.

f. As mentioned earlier, priority sector lending records the outstanding credit in the books of the banks on the last working Friday of March every year. RBI and NABARD should monitor banks' outstanding portfolio at least twice in a year, so that banks undertake mandatory lending to the agriculture sector during the kharif season as well.

C. Restructuring of Government Schemes

- In capital intensive projects, the interest can be capitalized and funded, so that the burden of high cost of interest is not faced by the company in the formative years

- The agencies could structure schemes in the form of capital subsidies, which in turn could be leveraged by the companies to access bank finance. Release of funds should be proportionate to the equity brought in by the promoters.

- In sectors, which are working capital intensive, the funding institutions should consider offering soft loans instead of grants. The soft loan would ensure that the companies undertake operations to service the interest payable to the institution.

- Market analysis prior to providing funding - Detailed market analysis of demand-supply trends, costs, competitive position should be undertaken by the funding institution/by a neutral third party which has the required industry expertise, to ascertain the financial viability of the project

In order to address the issues related to food parks, the recommendations are as follows:

- It is recommended that food parks be located in proximity to raw material sources to maximize the potential available locally. This will ensure better utilization of common facilities.
- The quantum of financial assistance to a food park needs to be decided on a case-specific basis, depending on the infrastructure requirements across locations. The financial appraisal of any food park scheme should be evaluated on the basis of potential for tie-ups with offtakers and sufficient availability of raw materials.
- The definition of common facilities could be expanded to include roads, drainage and solid waste management facilities etc.

- It is critical to have a monitoring mechanism to facilitate and review progress of implementation. The State Departments for food processing can play an active role in this process.

D. Promote Warehouse Receipt-based Financing

Warehouse receipt finance is a form of secured lending to owners of commodities, (farmers, traders, processors) which are stored in a warehouse, with the commodities having been assigned to a bank through warehouse receipts. On the back of the warehouse receipts being housed with the bank, the latter has the security of goods until they have been sold and the proceeds collected.

Warehouse receipts are a proven tool for financing, utilizing the stored goods as collateral for loans. The system has been working successfully from the beginning of the twentieth century in several countries such as Brazil, Indonesia, Singapore and Argentina. In addition to addressing the needs of food processors, as mentioned earlier, farmers can also benefit because it enables them to store produce and sell when prices are favourable.

Some of the advantages of a warehouse receipt system are:

- It provides a choice to primary producers who can decide to sell immediately after harvest or to store in a licensed warehouse and to apply for short-term credit. The farmer can decide to sell his crop later in the year, when prices are typically higher than at harvest time.
- It enables primary processors to purchase raw materials at favourable prices and store until required for processing
- The system leads to a reduction of post-harvest losses as the produce is stored under appropriate conditions in licensed warehouses.
- It translates into lower risks for the financier, as the collateral for the loan is a liquid asset.
- This can lend greater depth to operations of Commodity Exchanges, by increasing the number of transactions without physical movement of goods, through endorsement of the warehouse receipts

The Government can play an important role in promoting warehouse receipt-based financing through the following measures:

- Amend the Negotiable instruments act to introduce negotiability of warehouse receipts
- Creation of an appropriate legal environment to ensure ease in enforcement of security
- Facilitate development of a network of warehouses at appropriate locations
- Facilitate direct processor farmer linkages (rather than via the mandi) to enable warehouse receipt based financing
- Dematerialisation of warehouse receipts to enable electronic trading

The preconditions for successful implementation of a Warehouse Receipt System are in Appendix 12.

E. Infrastructure & Project finance

Infrastructure development can play an important role in improving efficiency across the supply chain and hence any financial assistance for rural infrastructure development including rural roads, markets, silos etc. should be classified as priority sector. It is recommended that the Government undertake the following measures to boost infrastructure creation for the agriculture and food sector-

- Creating an enabling legal and regulatory frame work for development of infrastructure
- Providing seed capital and leveraging the same for development of agri-infrastructure
- Monitoring and facilitating private sector participation
- Risk sharing with banks in financing agricultural infrastructure projects.

Public Private partnerships are key to development of agricultural infrastructure projects. The linkages between various players, which includes the users, the supply chain participants and operators are crucial. The projects can be structured based on the BOT (and its variant) model which ensures appropriate risk allocation between various players, including the Government.

Exhibit 5.3.1.A : Public Private Partnership Models

Option	Ownership	Financing	Management
Service Contract	Public	Public	Public, some Private
Management	Public	Public	Private
Lease	Public	Public	Private
Concession	Public	Private	Private
BOOT	Private, then Public	Private	Private
Reverse BOOT	Private, then Public	Private	Private
Joint Ownership	Private and Public	Private and Public	Private and Public
Outright Sale	Private	Private	Private

Source: Rabobank Research

Some of the project structures which can be adopted are as follows;

1. User Charge-based project structure: A Special Purpose Vehicle (SPV), funded by the sponsors and the financier is constituted. The Users, under a waterfall agreement pay on usage of the facility. These user charges service the debt.
2. Rated lease-based project structures: The Sponsors assign the assets to a Special Purpose Vehicle (SPV), financed through a mix of debt and equity (from financial investors). The SPV executes lease agreements with the lessee, who in turn pays lease rentals, which are used for regular debt servicing.
3. Receivables-based structure: This type of structure can be used for construction of rural roads or market yards, wherein the project is financed based on future receivables from a determined and realizable set of cashflows.

F. Amendment of restrictive Acts/Policies

As mentioned earlier, the following Acts need to be amended to facilitate increased flow of funds to the agriculture and food processing sectors

- Cooperatives Act- Allow scheduled banks to finance cooperative societies.
- State Warehousing Corporations Act- Allow scheduled banks to finance CWC/SWCs
- Land Ceiling Act – allow consolidation of land holdings to enable large scale cultivation

- Further, banks should be dispensed with the need for documentation for hypothecation of crops for loans upto INR 0.5 mn. These advances should be considered secured on the basis of a letter of undertaking

- Stamp Duty: The stamp duty charged on agricultural loans payable by farmers is an unnecessary burden on farmers, while enhancing Government revenues only marginally, and should be abolished.

G. Modification of evaluation parameters by banks/financial Institutions

1. **Corporate / market linkages**: Banks/financial institutions need to factor in linkages of processors with companies/markets for assured offtake, as also backward linkages for procurement,
2. **Corporate security: Banks/financial institutions can seek s**ecurity from output buyers (secondary processor/marketer) such as a "put option" for a specified period to take off the loan or a part of the loan in case of default
3. **Track record in risk assessment** – Banks need to allocate higher weightage to the track record of food companies while providing financing to them. This includes market feedback on company management and its operations, relationships with suppliers and buyers etc. Such market feedback will also provide insights on management's ability to deal with cyclicality.
4. **Leverage parameters**: Most food processing companies have high leverage as the net worth of the companies is low and the current liabilities are high. A higher leverage ratio can be considered for food processing companies, keeping in view the nature of the business, as compared to companies in other industry segments
5. **Cash Collateral as Security:** Cash collateral in the form of cash or cash equivalents which can be converted into cash without any erosion in value, can be taken as security. With the company providing a cash collateral, a higher weightage is assigned for this factor, as the risk associated with the loan is mitigated to a large extent. A cash collateral factor can supplement the profitability factor e.g. low weightage can be assigned to Profit After Tax (PAT) in the case of availability of high collaterals.
6. **Size criteria:** Most companies in the food processing sector have limited scale of operations, with turnover in the range of INR 100 million to INR 150 million, on account of the structure of the supply chain as described earlier. The company's operation cannot be assessed based on turnover. Thus, low weightage should be assigned to the turnover criteria.

H. Role of State Governments

State Governments should consider participation with the industry in the food processing sector through minor equity participation in private projects, which lends a 'State project status'. This can not only be beneficial in terms of facilitating speedy clearances for projects, but also lend state machinery (unused land/state-owned storage facilities/state extension services) to these projects.

5.4 Risk mitigation in agribusiness

5.4.1 Price Hedging

India has 20 regional exchanges dealing in one/few commodities. Recently the Government allowed multi commodity exchanges to operate in the Indian market. The Government has permitted trading in 120 commodity and commodity derivatives in the futures market. However, the commodity exchanges face several bottlenecks which include:

Regional Exchanges

- Small number of participants
- Dominance of brokers; Cartelisation
- Lack of trust in operations (especially clearing) of futures exchanges
- Low incidence of transactions with physical settlement
- Commercial viability of exchanges under question as each exchange handles one / few commodities – lack of critical transaction volumes

Others

- Forward Markets Commission is not a well-funded and strong body with powers for regulation
- Government policies impacting real price discovery
- Minimum support prices, which impact the price level, and render Indian prices out of line with international prices
- Lack of clear guidelines on proper tax recognition of hedging
- High cost of risk management due to stamp duties in some states
- Government ban on use of futures by banks
- Options are not allowed to be traded
- Warehouse Receipts are not negotiable and freely transferable instruments
- Lack of standardization of commodities

Some of the solution themes identified which can assist in development of a robust futures market are as follows:

1. Removal of regulatory bottlenecks

- Amendment required in FCRA 1952 for the following
- Changing the definition of commodity to be an exclusive definition (for instance "anything not a security" as defined in the USA)
- Bifurcation of the commodity into (i) goods & (ii) non-goods – all existing commodities will be goods, while non-goods will include indices, weather etc. non-goods which will be allowed to be cash settled.
- Introduction of options trading
- Equip the FMC with penal powers for arbitration

2. Ensure presence of nationally unified spot and futures markets

- Mandi prices should be provided on a real time basis to all futures exchanges
- All exchanges should adopt on-line trading to allow access even at remote trading centres and thus ensure better participation and price discovery

3. Improve Physical settlement procedures

A. Standardization of commodities– Institute mechanism for grading of various traded commodities

B. Strengthen Warehouse Receipts System: In addition to the measures listed earlier, in the context of futures trading, the FMC needs to make it mandatory for all exchanges to either certify warehouse operators or set up a professional collateral management body

4. Remove taxation hurdles

- Allow set-off of commodity futures trading against business profits/losses to enable farmers to participate in the exchanges
- Income tax rules mandate that an entity engaged in hedging should have a firm contract in the underlying commodity or have possession of the goods against which hedging is being undertaken, in the absence of which the entity is liable to pay capital gains tax (30%). The rules should be amended such that the trader can submit the proof of the actual possession of the commodity at a future date, when the derivatives transaction is being concluded.

5. Clarity on policy framework for import duties

Frequent and sudden duty changes on commodities hampers trading. The policy parameters for changes in duty structure in the medium term, should be well-established to enable players to operate effectively.

6. Provide depth to the market through higher volumes

- Allow banks and mutual funds to participate in commodities trading

5.5 FDI in Food processing industries

FDI in the food processing sector is low, constituting about 4% of total FDI inflow during the period 1991 to 2004. Most food processing sectors have been placed under a liberal, transparent and investor friendly FDI policy allowing 100% FDI through the automatic route for most food processing sectors. However, some of the sub-sectors which are barred from FDI include agriculture and plantation excluding tea plantations and retail trade in any form (except cash & carry formats). In alcoholic beverages setting up of new manufacturing capacities is not permitted and only existing players can expand capacities, which hinders FDI flow to the sector.

Exhibit 5.5.A: Sector wise summary of approvals in Food industry (1991 – 2004)

Figures in INR billion

Sector	No. of Approvals	Foreign	NRI	Total
Grain processing	107	12.6	1.1	13.6
Fruits & vegetables	265	8.2	2.8	11.0
Meat & Poultry	39	2.2	0.5	2.7
Fish Processing	104	5.0	0.5	5.5
Consumer Industries	78	44.1	0.9	45.0
Coffee, Tea	11	0.01	0.1	0.1
Beer & Alcohol	49	9.8	1.1	10.9
Milk & Dairy Products	38	11.7	0.6	12.3
Food Additives & Oleoresins	114	14.3	0.9	15.2
Total	805	107.9	8.6	116.4

Source: Ministry of Food Processing Industry

A. Issues in FDI for Food Processing

1. Supply-chain issues: Factors such as lack of **farmer-processor linkages**, **poor quality of infrastructure, fragmented retail distribution and regulatory hurdles,** which are discussed in earlier sections of this report which have affected inflows of FDI in food processing .

2. Procedural bottlenecks: The requirement of multiple approvals, together with delays in obtaining approvals leads to cost overruns, and impacts investor confidence. A project can be categorised into three stages- approval, clearance and implementation. Industry sources state

that the stage of obtaining clearances is a bottleneck, as there is duplication of procedures of the Central and the State Governments.

3. Quality perception: While this perception is fast changing for other sectors such as pharmaceuticals, foreign investors associate India with low/average quality in agricultural produce.

In contrast to India, China has seen significant FDI inflows, including in food processing.

Exhibit 5.5.B Trade in Food and Agricultural Products

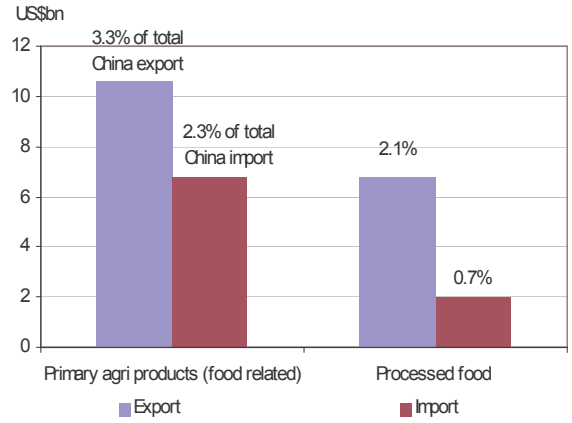
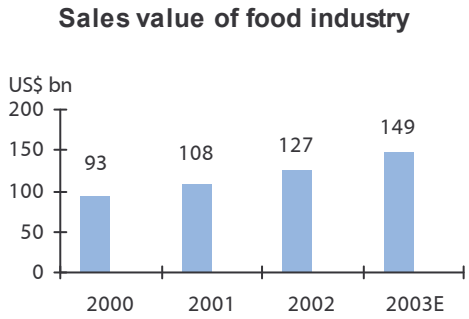


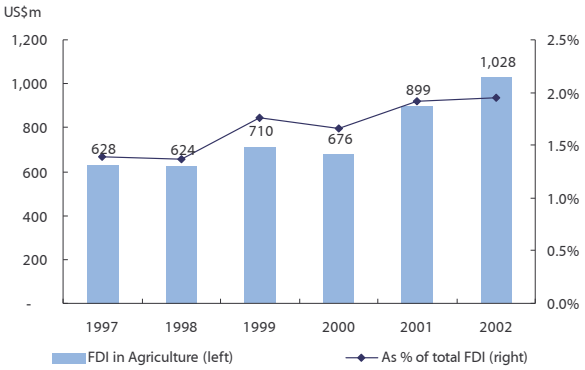
Exhibit 5.5.C: Size of the Industry



Source: Rabobank Research

Foreign companies play an active role in a number of food industry sectors, such as soft drinks, infant formula milk powder, instant noodle, and snacks. Key international players with significant investments in China include: Danone, the Coca-Cola Co., PepsiCo, Cadbury, Hormel, Nestle, Unilever, Wyeth, Mead Johnson, Want Want and Uni-President.

Exhibit 5.5.D FDI in China



Source: Industry Estimates

Exhibit 5.5.E: Stages of development of FDI in Food sector

1980s	Early 1990s	Late 1990s	Post 2000
Feeling for stones Small JVs with local partners match-made by gov.	Premature euphoria Arrival of Asian investment early MNC success stories attracts more investment in various sectors	Steady state Second round of MNCs is large scale with world class facilities; Supply chain participants followed	Expansion and renewal MNCs revitalized business models, presented improving financials and indicated brighter outlook

Source: Industry Estimates

Some of the measures which have augmented FDI inflows in food processing are:

- Single window clearing system for Agri/food projects
- Development of agri processing zones near coastal areas
- State investment in development of logistics systems
- Land reforms- Removal of collective land ownership system, extending land lease to 30 years for individual households
- Investment in high yielding varieties, across crops
- Upgrading cultivation practices in states to cater to specific world markets e.g. Shandong province shifted from grains to vegetables to cater to the Japanese market

5.5.2 Recommendations to increase FDI in Food Processing

In addition to implementing solution themes to enhance supply chain efficiencies and remove regulatory bottlenecks, specific measures to increase FDI in food processing include:

A. Single window clearance for FDI in Food processing can assist in increasing inflow into the sector. Association of a Central government officer with the investor, who facilitates all clearances, both Central and State, can be an effective solution

B. It is imperative for both the Central and the State Government to launch a high intensity campaign for investments in the food processing sector in India. With the reduction of agricultural subsidies across several developed markets, international players will seek to invest in high growth markets. Market development efforts can therefore boost the confidence of potential entrants. A sector specific approach for marketing to international investors is required. Also, examples of successful investments by MNCs can be showcased to international companies. The MFPI can coordinate these efforts together with respective State Governments,

5.6 Action Plan

Central Government	Credit • Amendment of Cooperative Act to allow private banks to lend to PACS • Amendment of Warehousing Corporation Act to allow banks to lend for infrastructure creation • • Redefine role of Regional Rural Banks and amendment of the RRB Act for effective utilization of RRB setup • Amend the Negotiable Instruments Act to introduce negotiability of warehouse receipts • Creation of an appropriate legal environment to ensure ease in enforcement of security • Facilitate development of a network of warehouses at appropriate locations • Participate in Public Private partnerships through structured term lending for infrastructure development Commodities Trading • Allow mutual funds to participate in Commodity derivatives trade • Institute mechanism for grading of various traded commodities • Allow set-off of commodity futures trading against business profits/losses to enable farmers to participate in the exchanges • Clarity on policy framework for import duties FDI • Single window clearance for FDI in Food Processing

	• Ministry of Food Processing to undertake sector-specific campaigns, in conjunction with State Governments, to attract FDI
State Governments	Credit • Abolition of stamp duty on agricultural loans • Amendment of Land Ceiling Act to allow consolidation of landholdings for cultivation • Amend APMC Acts to permit direct farmer processor linkages • Empanelling Certification agencies at State level for gradation and certification for collateral based financing • Provide seed capital for development of agri infrastructure projects Other • Minority equity participation in projects being set up in the State • Location of food parks to take into account demand potential as well as availability of raw material
RBI	Credit • Permit banks to dispense with documentation for hypothecation for crop loans • Amendment in Priority Sector lending o Include Food Processing in direct priority lending o Remove ceiling on quantum of financing to food processing units to qualify for priority sector lending o Remove ceiling on farm loans for direct finance o Include long term lending to agriculture in direct lending • Monitor Bank's priority sector portfolio every 6 months Commodities Trading • Amend Banking Regulation Act to permit Banks to undertake trade in commodity derivatives • Amend FCRA 1952 to redefine commodities, to broaden the scope of the derivatives market and introduce options trading
Banks	Credit • Revise evaluation parameters for food processing companies
Nodal Agencies	• Institute monitoring mechanism for projects assisted under schemes and grants • Rigorous analysis to be undertaken by the funding body • In capital intensive projects, the interest can be capitalized and funded, so that the burden of high cost of interest is not faced by the company in the formative years • Structure schemes in the form of capital subsidy to be released in a phased manner during project implementation, rather than on project completion • In sectors, which are working capital intensive, the funding institutions should consider offering soft loans • The quantum of financial assistance to a food park needs to be decided on a case-specific basis, depending on the infrastructure requirements across locations.

Chapter 6

Taxation

The taxes levied on domestically manufactured food and beverage products can be categorised into

- Centre-level taxes – mainly excise duties
- State-level taxes such as sales tax, entry tax, octroi etc.

Customs duties and countervailing duties are levied on imported food products.

These levies add to the cost build-up for food products, rendering them expensive and unaffordable to a large cross-section of consumers, although these are products for mass consumption. In addition, high level of taxation on processing and packaging equipment is a hindrance to investments in the food processing sector.

6.1 Existing Structure of Taxes and Duties

A. Excise Duties

Fruits and vegetable products and milk and milk based products (with the exception of condensed milk) are exempt from excise duty. Excise duty of 8% is levied on meat based preparations, bread, biscuits and sugar boiled confectionery. Excise duty of 16% is levied on malted foods, chocolate, bakery preparations, other processed foods, packaging material and machinery. Additional excise duty of INR 1/kg is levied on tea.

Exhibit 6.1A: Excise Duty on Processed Foods, Packaging Equipment and Materials

Products	Excise Duty (%)
Fruit & Vegetable Products	Exempt
Milk & Milk Products (except condensed milk)	Exempt
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates, including sausages and similar products, extracts and juices, prepared or preserved fish and caviar and caviar substitutes	8
Bread, Biscuits including wafers	8
Pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa, communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products	16
Sugar boiled confectionery	8
Chocolate	16
Malted food	16
Malted food for infant use	0
Tea	INR 1/kg
Refined Oil	INR 1/Kg
Other processed foods	16
Packaging materials for processed foods	16
Processing and Packaging Machinery/equipment	16

Source: Rabobank Research

B. Customs Duty

The customs duty on agricultural raw materials and on most processed foods (with the exception of edible oils and alcoholic beverages) is 30%.

Exhibit 6.1B: Customs Duty on Processed Foods, Packaging Equipment and Materials

Products	Customs Duty (%)
Fruit pulp, juices, fruit-based drinks	30
Milk & Milk Products*	30
Branded, packed preparations of meat, fish and poultry	100
Bread, Biscuits including wafers	8
Other food products	30
Tea	100
Refined Oil	INR 1/Kg
Other processed foods	16

The customs duty structure on edible oils is provided below.

Exhibit 6.1C: Customs Duty on edible oils

Description	Import Duty
Crude Palm Oil (500-2500 mg/kg)	65%
Crude Palm Oil (<500 mg/kg)	75%
RBD Palm Oil	75%
RBD Palmolien	75%
Crude Palmolein	65%
Non-Edible Crude Palm Oil	20%

The customs duty on key machinery items imported by the food industry is either of 20% or 25%.

C. State-level taxes

These taxes vary across states, and are levied on all packaged products, including those which do not attract excise duties. As an example, the tax structure levied on biscuits across various states is provided below:

Exhibit 6.1D: State-level taxation on biscuits

State/U.T.	Sales tax	Addl. Tax	Surcharge	Turnover Tax	Rebate	Total	Entry tax
Andhra Pradesh	16%	0%	0%	0%	0%	16.0%	
Kerala	12%	15%	0%	0%	0%	13.8%	
Tamil Nadu	12%	0%	5%	1%	0%	13.6%	
Karnataka	16%	1%	15%	0%	0%	16.2%	1.0%
Bihar	9%	1%	10%	11%	INR50000/year		
Orissa	12%	0%	10%	0%	0.00%	13.2%	2.0%
Jharkhand	9%	0%	10%	1%	0.50%	9.95%	
Assam	8%	10%	0%	0%	0%	8.8%	
West Bengal	10%	0%	15%	0%	0%	11.5%	
Chattisgarh	12%	0%	15%	0%	0%	13.8%	1.0%
Uttar Pradesh	8%	0%	0%	0%	0%	8 %	

State/U.T.	Sales tax	Addl. Tax	Surcharge	Turnover Tax	Rebate	Total	Entry tax
Punjab	8%	0%	10%	0%	0%	8.8%	0.6% per kg
Jammu & Kashmir	8%	0%	5%	0%	0%	8.4%	
Uttaranchal	8%	0%	0%	0%	0%	8.0%	
Haryana	10%	0%	0%	0%	0%	10.0%	
Delhi	8%	0%	0%	0%	0%	8.0%	
Rajasthan	9%	0%	0%	0%	0%	9.2%	
Goa	8%	0%	10%	0%	0%	8.8%	
Madhya pradesh	12%	0%	15%	0%	0%	13.8%	1.0%
Gujarat	12%	0%	10%	0%	0%	13.2%	
Himachal Pradesh	8%						
Chandigarh	8%		10%				

Source – Federation of Biscuit Manufacturers Association of India

D. Value Added T ax

VAT, which is to be implemented during the upcoming financial year, will be applicable to food and beverage products, with the exception of alcoholic beverages The proposed VAT (Value Added Tax) is nil for foodgrains and cereals, 4% for branded bread and edible oil and 12.5 % for all other processed products. The proposed VAT rate of 12.5 % on processed foods is one of the highest in the world.

Exhibit 6.1E: VAT Rates on Food Products

Country	VAT Rate (%)
Ireland, UK, South Africa	0
Switzerland	2.3
Luxembourg	3
Portugal, Japan	5
France	5.5
Belgium, Holland	6
Spain, Germany	7
Greece, Turkey	8
Italy, Russia, Korea, Australia	10
Norway, Sweden	12
China	13
Denmark	25

Source: Rabobank Research

6.2 Issues with the current level of taxation

6.2.1 Excise and state-level taxes

High level of taxation– The current tax rates on food products in India, are among the highest in the world. The incidence of various taxes (Excise and State taxes) on select processed foods is provided below. This illustrates the cost build-up for food products on account of various taxes.

Exhibit 6.2 A : Tax Incidence (Excise and State Taxes) in Processed Food Products

Product	Share of Taxes in MRP (%)
Branded Atta	6
Potato Chips	9
Jams	11
Fruit Juices	17
Branded Chicken Nuggets	15

Source: Rabobank Research

In addition to the above, there is indirect impact on the cost of production due to high excise duty of 16% on packaging material and machinery.

The branded frozen foods segment is miniscule at present. The prevalence of 8% excise duty on branded and packed processed food products is an unnecessary burden on the segment.

The excise duty levied on refined oil is a deterrent to value addition, which can lead to better product offerings to consumers.

The use of aluminium, SS milk cans, bulk coolers is essential for boosting clean milk production. However, excise duty of 16% is levied on most dairy equipment/machinery. This increases the cost of such machinery. Further, the current excise duty on packaging material for the dairy sector ie plastic containers, aseptic packaging material etc is 16% .

Multiplicity of taxation- As provided earlier, there are several state-level taxes levied on food products such as sales tax, entry tax, octroi etc., which add to the complexity of manufacturers' operations. At the same time, the contribution of some of these taxes to state exchequers is nil, highlighting that the administrative costs for the Government offset the revenue earned on account of these levies.

Classification anomalies - There are several classification related anomalies, arising from a narrow definition of the categories which have been declared as tax exempt. This in turn has hindered innovation. This is seen to be one of the key reasons for the lacklustre growth in value-added segments in categories such as milk, coffee, tea and biscuits. While milk is exempt from excise duty, masala milk is taxable at 16%. Similarly while sambar/rasam powder have been exempt, instant powder is taxable at 16%. Preparations comprising coffee/milk with added ingredients are taxable at 16% while coffee and milk are exempt. Similarly, sweet and savoury spreads which are used as a substitute for butter and cheese are taxed at 16%, although butter and cheese are exempt from excise duty. Ready to eat products, made from vegetables are taxed at 16%, although vegetable-based products are exempt from excise duties. This has hindered players from establishing scale of operations in these emerging segments.

6.2.2 Customs Duty

A. Edible Oils

The edible oil sector has witnessed frequent change in import duties, which favour import of crude oil at certain times and import of refined oils at others. This has increased operational complexity for the domestic processing industry. During certain periods in recent years, the duty on crude oil has exceeded duty on refined oil, thus discouraging local value addition.

Further, the lower rate of duty on soybean oil as compared to sunflower and other oils, has resulted in a skew in imports in favour of soybean oil.

The duty differentials should be based on an audited cost structure for palm, soybean and sunflower oil, established by the government. This structure should have the flexibility to

determine the tariff rates/duties, adjusting to varying international prices, such that the cost to the consumer does not exceed a pre-determined value.

B. Packaging material
Supply of raw material required by the metal container industry falls short of demand. The existing customs tariff of 25% on prime tinplate and 40% on non-prime tinplate is impacting costs adversely. As packaging material, it is superior in terms of shelf life, rigidity, and potential for recycling. The duty on other packaging material is high such as for paperboard at 40% and for aluminium foil at 34.5%.

C. Packaging machinery
Similarly, the tax incidence on aseptic processing and filling equipment is about 40%, as compared to other Asian countries such as Thailand (5%), Philippines (1%). The high level of input costs has hindered the ability of food processors to price their products competitively.

D. Raw materials
Maize is not the most preferred crop for cultivation, in a regulatory environment which provides attractive support prices for competing grains – rice and wheat. As maize is primarily a rain-fed crop, the annual production level is dependent on monsoons, and therefore displays significant fluctuations. Demand for maize exceeds local supply. Maize is currently in the TRQ (Tariff Rate Quota) regime which stipulates that the first 500,000 MT of imports are permitted with an import duty of 15%, and for imports exceeding this quantum, there is a duty of 50%. At the in-quota tariff of 15%, maize imports are unviable. This anomaly needs to be addressed.

In addition to direct impact leading to higher costs, the key issues that arise on account of the current tax structure are as follows:

- This translates into a huge cost advantage to players offering unbranded foods, and penalises branded food companies.
- This disincentivises product innovation. The market size for new product segments, which aim to address emerging needs of consumers such as convenience and hygiene remains insignificant. Food processing companies are unable to invest in market development due to negligible margins on these products.
- State duties are not revised in tandem with the central duties. In some cases, state duties are increased when central duties are reduced, thus offsetting the benefits on account of lower central duties

6.3 Recommendations

Food processing is a sunrise industry, and betterment of the agricultural sector is dependent on this industry. As has already been detailed in earlier sections of this report, the industry faces several challenges such as perishability, lack of direct processor-farmer linkages, high cost of external funding, lack of economies of scale and low capacity utilisation. As has been the case for other sectors such as IT, where the Government has granted significant tax concessions until the industry attains meaningful scale. It is recommended that the Government modify the taxation framework for the sector as follows:

- remove all indirect taxes at the Centre and State level, on all food products and on packaging material for the food sector with the exception of any products which have adverse health implications
- reduce customs duty on food processing and packaging machinery; packaging material and cold chain equipment from current levels to the lowest slab.

The tax and duty rationalisation on food products and machinery, is integral to achieve the envisioned scenario for the food processing sector. Further it will translate into significant spin-off benefits for the agriculture sector, ensuring that there is a 'pull' for the increased agricultural production. In comparison, the loss of revenue for the Government will be insignificant given the nascent stage of the industry.

Chapter 7

Food Safety and Hygiene

7.1. Background

Food safety is a growing concern across the world. There is increasing need to provide greater assurance about the safety and quality of food to consumers. The increase in world food trade, India's potential to garner a higher share in world food trade and the advent of the Sanitary and Phytosanitary (SPS) Agreement under the World Trade Organization (WTO) have led to increasing recognition and adoption of food safety measures.

The capacity of India to penetrate world markets depends on its ability to meet increasingly stringent food safety standards imposed in developed countries. Food standards are expected to acquire greater importance given increasing concerns on food safety on the back of breakout of diseases such as BSE, Avian Influenza etc on the one hand, and growing consumer demand for products which are healthy on the other. Therefore, compliance with international food standards is a prerequisite to gain a higher share of world trade.

At the same time there is growing awareness among Indian consumers given recent controversies on quality standards of many food products. The players in the Indian food industry need to keep these trends in view and meet domestic and international consumer demand for safe food.

7.2. Existing laws governing food safety

The Indian food regulations comprise various food laws that have been enacted at different points of time and are under the ambit of various ministries. Many ministries deal with food laws resulting in multiple bodies which set food standards. A brief description of key laws is as follows:

Exhibit 7.2.1.: Laws and Ministries regulating Food Standards

	Ministry of Food and Civil Supplies	Ministry of Food Processing	Ministry of Agriculture	Ministry of Health and Family Welfare	Ministry of Commerce	Ministry of Consumer Affairs
Prevention of Food Adulteration Act 1954 (PFA)				✓		
Essential Commodities Act, 1955 (ECA)	✓ Vegetable oils, De-oiled meal and edible flour control order, 1967 (VPO)	✓ Fruit Product Order, 1955 (FPO)	✓ Meat Food Products Order, 1973 (MFPO), Milk and Milk Products Order, 1992 (MMPO)			
Agricultural Produce (Grading and Marketing) Act 1937			✓			
Bureau of Indian						✓

	Ministry of Food and Civil Supplies	Ministry of Food Processing	Ministry of Agriculture	Ministry of Health and Family Welfare	Ministry of Commerce	Ministry of Consumer Affairs
Standards, 1986						
Standards and Weights Measure Act, 1976	✔					
Export (Quality Control and Inspection) Act, 1963					✔	

The focus areas of various laws is one or more of the following:

- Prevent adulteration
- Regulation of hygienic conditions
- Information to consumers about products, manufacturers etc
- Provide product specifications
- Specifications for exports

7.3 Key issues with food laws, standards and testing infrastructure

7.3.1 Issues with food laws and standards

Multiplicity of food laws, standard setting and enforcement agencies pervade different sectors of food, which create confusion in the mind of consumers, traders and manufacturers. The specific issues are as follows:

- There are relatively few standards developed for raw agricultural produce. The existing standards for such products primarily stipulate physical parameters of size, colour and farm impurities. Few standards address issues related to microbiological and toxicological characteristics.
- Food laws are often inconsistent and overlapping. For e.g., there is ambiguity and overlap between the standards laid down in PFA and FPO. In many cases, where one standard is more stringent than the other, the industry often prefers to adopt the more stringent standard in order to prevent potential penalisation. For example,
  - FPO allows use of artificial sweeteners in certain fruit products whereas PFA does not. Hence, the industry avoids using artificial sweeteners in their products.
  - Emulsifiers and Stabilisers are permitted for use in Jams, Marmalade & Fruit Chutney under PFA but not under FPO. Hence certain players choose not to use them.

  Internationally, most countries are adopting a one law – one regulator model like the USA, the UK and Malaysia. Further, supra-national authorities for regulating food standards are emerging, such as in the EU, Australia and New Zealand.
- PFA specifies the list of additives that can be used in food products. Use of any other additive can potentially render this as 'adulteration' even if the additive is safe. Thus, the use of

additives in various food preparations has become restrictive. The health ministry is considering various proposals made by the industry regarding the use of additives.

- The PFA lays emphasis on the prevention of adulteration of foods, but does not address issues related to contamination in the food chain.
- The emphasis of PFA on end product / recipe discourages product innovation. PFA is prescriptive & recipe-based (PFA lays down over 300 recipes), thus restricting product innovation and choice to the consumers. For e.g., ice creams must have 10 % milk fat - which restricts companies from marketing low-fat ice creams. Similarly, jams must have minimum soluble solids and an 'all fruit no sugar jam' cannot be marketed. Although companies can request for case-specific approvals for their products, this is a cumbersome and time-consuming process.
- There is lack of transparency & participation in setting food standards. The Central Committee for Food Standards (CCFS) is the expert body that recommends mandatory national food standards under the PFA Act. It has representatives from the central government, state governments, research institutions, laboratories, consumer organisations and industry. There are various sub-committees under CCFS, which make recommendations on food standards for the respective sectors.

  The composition of the CCFS is heavily skewed in favour of government organizations and there is no meaningful participation by Industry or other stakeholders. There is only one representative from the industry who is allowed to participate in the meeting. The frequency of CCFS meetings is very low - usually once in a year, and deliberations of CCFS are not time-bound. This leads to delays in decision making. According to a leading industry body, the time taken to approve any modifications in standards sometimes exceeds two years.
- The Food Inspectors (approximately 6000 in number), while aware of legal nuances of their role, very often have no scientific background, and lack training in GMP,GHP & HACCP.

7.3.2. Issues with food testing facilities in India

The infrastructure available for food testing include 140 Government laboratories and 50 Private laboratories.

Exhibit 7.3.2.A :Food Laboratories in India

Laboratory Classification	Approximate Number of Laboratories
Government (Ministry / Department)	
Ministry of Health and family Welfare (PFA) - Central Govt, State Govt and Local bodies	84
Agriculture Marketing Advisor, New Delhi (Agmark Laboratories)	23
Council of Scientific and Industrial Research, New Delhi	12
Indian Institute of Packaging	4
Ministry of Food Processing Industries	1
Export Inspection Council	4
Bureau of Indian Standards	4
Indian Council of Agricultural Research	4
Private	
Laboratories under Private Industries (owned by companies)	24
Private Testing Laboratories	22
Others	
Consumer Association Laboratories	5

Source: MFPI, National Institute of Nutrition

The key issues related to food testing facilities in India are:

- The industry is of the view that the current level of infrastructure for testing, referral services, development of standards and equipment is highly inadequate. The number of laboratories in the country is insufficient. Most of these laboratories lack world-class facilities and infrastructure. Many laboratories are not equipped with basic facilities such as for testing antibiotic residues, heavy metal contamination and other toxic contaminants in the food items. Further, testing manuals do not describe parameters and procedures adequately.
- The response time of several Government controlled food laboratories is long, extending to upto 5 years which poses an operational hurdle for industry players.
- There are few laboratories / institutes which have infrastructure and manpower to educate and train the industry on food testing. There is need for conducting training programmes for the industry on Codex, HACCP, GMP, GHP and appropriate testing methods.
- The repository of international food standards (country x product level) and the testing procedures with the laboratories is inadequate. There is lack of information on methods of sampling, inspection, and testing of various trading partners. This lack of clarity on specific requirements can often lead to rejection at the point of import.

7.4 International case studies

This section analyses the international practices with respect to setting of food standards and their enforcement.

Exhibit 7.4.A Case Studies – Setting and Enforcement of Food Standards

	USA	UK	Australia	Malaysia
Single window approach	✓	✓		
Supply chain focus	✓	✓	✓	
Mechanism for interface with international agencies, Government departments, industry and consumers	✓	✓	✓	✓
Continuous research	✓	✓	✓	✓

Source: Rabobank Analysis

A. United States of America (USA)

Food standards are established under the Food, Drug and Cosmetics act enforced by the Food and Drug Administration (FDA). The FDA is responsible for ensuring compliance with the standards of identity, quality and containers for all products[10]. FDA develops standards for composition, quality, safety, colour additives, nutritional value and labeling of foods. The standard of quality set by this Act is a minimum standard. FDA is also responsible for conducting research on contamination prevention measures, collection and interpretation of data on nutrition, food additives and pesticide residues. The FDA inspects food processing plants and imported food products to ensure appropriate safety measures and compliance with standards.

The regulatory bodies for ensuring food safety and quality in USA primarily comprise of the Department of Health and Human Services and the Department of Agriculture. The federal system has around 35 laws and involves 12 agencies. However, the responsibilities of these agencies are addressed by interagency agreements avoiding duplication of efforts, conflicting actions and gaps in coverage.

[10] except for meat, poultry and egg products

B. United Kingdom (UK)

FSA is the single authority responsible for formulating all food laws and regulations, and advising Government on the need for legislation on all aspects of food safety and standards.

The agency obtains advice from independent scientific advisory committees and also commissions research and surveillance. It works closely with the food industry to track technological developments so as to develop high standards of food safety. FSA monitors the entire food chain, from the farm to retail / food service outlets. It comprises of three groups:

a) Food safety policy group: It deals with all aspects of food safety and nutrition across the food chain. It includes various divisions for setting standards for additives, novel foods, animal feed composition, contamination and nutrition
b) Enforcement of food standards and consumer protection group: This group is responsible for enforcement of food labeling, standards, hygiene requirements etc.
c) Corporate resources and strategy group: It coordinates with international organizations and other government departments. It provides economical and statistical data, and operational research support to the organization. It also deals with training and developmental issues.

C. Australia

Food standards in Australia and New Zealand are set and governed by an independent statutory authority, Food Standards – Australia New Zealand (FSANZ). FSANZ is accountable to the Australian and New Zealand Food Regulation Ministerial Council, composed of the National and State Ministers for Health, from Australia and New Zealand. The Australian Government and the wider community regard matters of food safety and security of the highest priority, and a clear role exists for the Government, in collaboration with the food industry and community, to regulate and enforce high standards of food safety.

Food standards in Australia cover all components of the food supply chain. This includes the development of standards for primary production (particularly use of chemicals), processing, manufacturing and labeling. As well as covering the domestic food industry, FSANZ also provides risk assessment advice on imported food, and is regarded as an important source of information and research for the community on food and dietary issues. Generally, Food Standards are set using the best available scientific information, with opportunity provided to the public and the food industry sectors to provide inputs and submissions on various food industry standards. In the absence of hard scientific data, a precautionary approach is adopted towards food standards.

Australian Food Standards cover a wide range of issues, including labeling and information requirements, food additives, contaminants and residues, microbiological and processing requirements, food product standards across all major food groups, special purpose foods, and primary production standards.

The governance and implementation of Australia's Food Standards is the responsibility of the various state and territory governments, primarily through State Departments of Health.

D. Malaysia

The Standards and Industrial Research Institute of Malaysia (SIRIM) lays down standards for various food products. It also provides an opportunity for food manufacturers to subject their products voluntarily to testing. If products satisfy the standards, they may use the SIRIM mark as an indicator of quality on their products.

Plans for sampling and inspection programmes are developed at the state level. District level personnel are responsible for the enforcement of food hygiene and safety. Imported foods are sampled on a random basis.

Food quality control laboratories were established in conformity with the Food Act. These laboratories provide analytical support for food sampling activities and certification of food products for exports. A Laboratory Procedural Manual for Food Quality Control provides the microbiological and chemical methods which are considered acceptable.

7.5 Strategy and Action Plan

The strategy and action plan includes the following:

A. Development of Integrated food law
B. Harmonization with Codex standards
C. Strengthening institutional set-up for setting standards
D. Strengthening the infrastructure and coordination among food testing laboratories
E. Training of small and unorganized sector including street vendors
F. Training of food inspectors

7.5.1 Development of Integrated Food Law

The integrated food law, which is under preparation, should ensure safe and wholesome food to consumers. The food law should be comprehensive, contemporary and ensure better consumer safety through food safety systems and setting standards based on science and transparency as also meet the dynamic requirement of international trade and Indian food industry. It should be able to create an enabling environment for value addition to primary agricultural produce, to foster innovation and creativity, and rapid development of food processing industries in an integrated manner, ensuring a high degree of objectivity and transparency. It should also specify quality norms for meeting globally recognized standards. This law should aim to cover all foods and beverages consumed in India.

7.5.2 Harmonisation with Codex standards

Codex Alimentarius (“Codex”) develops food safety standards that serve as a reference for international food trade. Since the conclusion of the Uruguay Round in 1994, Codex’s global role has been strengthened. The World Trade Organisation Agreement on Sanitary and Phytosanitary Measures (SPS Agreement) considers that WTO members applying Codex standards should meet their obligations under this Agreement and commit to "playing a full part within limits of their

resources" in Codex. The WTO encourages members to use international "standards, guidelines, and recommendations where they exist." Members have the flexibility to deviate from international standards for a justified legitimate scientific reason. Decisions taken under the WTO dispute settlement action will be based on whether a science-based risk assessment can justify a restrictive national standard that may be challenged.

The objectives of Indian food standards under PFA (Prevention of Food Adulteration Act) and those of food standards laid down by Codex Alimentarius are different. The emphasis under the PFA Act is on prevention of food adulteration. Standards laid down under PFA Rules are deemed to be minimum standards of quality whereas the aim of Codex Alimentarius is to develop standards with the object of promoting fair trade practices in International trade and protect the health of consumers.

The presentation of Food Standards under Codex and PFA are different. The format of Codex Standards includes:

- Name of commodity
- Scope
- Description/Definition
- Essential Composition
- Quality criteria
- Hygiene Food Additives
- Contaminants
- Labeling and
- Methods of sampling and analysis.

The PFA Standards include:

- Name of commodity
- Description/Definition and Essential quality criteria
- List of restricted and permissible additives

The addition of colouring to any food, except as specifically permitted in the PFA, is prohibited. The PFA lists permissible coloring additives (both natural and synthetic) and the products where they can be added. Similarly, PFA restricts preservatives and flavoring agents in food preparations. Also, under the PFA, no guidelines have been laid down on hygiene relating to handling and processing of food, and methods of sampling and analysis.

The differences between Codex and PFA in terms of food products/beverages covered, labeling, additives, practices and guidelines are as follows:

Exhibit 7.5.A: Differences between PFA and Codex

	PFA	Codex
Foods covered	228	234
Food Additives	34 (including additives compulsory BIS certification)	32 functional groups
Flavouring agents	-	36 structural groups
Labeling Standards and General Standards	-	6
Codes of practice	-	49
Guide lines	-	41

Source: Codex and Consumer Voice, India's leading consumer organization

In addition to standards; Codex lays down the requirements of hygiene, methods of sampling and analysis and various provisions of labeling etc., which are not covered under the PFA.
Codex Standards have now become the international point of reference under WTO. Member countries are compulsorily required to prove equivalence of their standards with Codex Standards to prevent any non-tariff trade dispute. It is important that Indian companies exporting food & beverage products meet the requisite standards. Therefore, PFA Standards need to be examined with reference to Codex Standards and be aligned/harmonized to the extent possible.

Although, complete alignment of PFA with Codex is not possible due to differences in dietary habits, there are areas where harmonization of PFA standards with Codex Standards would enable improvement of quality standards, encourage product innovation and increase acceptance of Indian products in the world market. Lack of alignment of food standards has already started hurting Indian exports. There have been cases of rejection of Indian consignments of marine products, fruit pulp and fruit concentrates for not meeting standards of importing countries.

It is suggested that a phase-wise approach for the harmonization of Indian food standards with Codex as follows:
Phase 1: Focus on foods which have an export potential or which may be imported to address shortages/demand
Phase 2: Focus on foods which are meant entirely for domestic consumption

7.5.3 Strengthening the institutional infrastructure for setting standards

There is need for an institutional set-up which can provide scientific advice on all matters with direct or indirect impact on food safety. The institute(s) can play an important role in the following areas:

- scientific evaluation of risks
- collection and analysis of scientific data
- identification of emerging risks; and
- scientific support to the government particularly in the case of a food safety crisis

In order to achieve the above, it is suggested that the Government appoint an institute to take up the following roles:

- Identify health determinants (i.e. factors such as average daily intake, lifestyle, social conditions, environment and working conditions that impact consumer health).
- Lay down the general principles and requirements of food law, and procedures in matters of food safety
- Assist in formulating food safety legislation for products which are hitherto not covered such as animal nutrition, GMOs, food and feed labeling, frozen food temperatures, pesticide residues etc.
- Provide accurate and updated information on modifications in food standards in India and internationally as well as on sanitary or phytosanitary regulations (adopted or proposed) and develop a repository of the same

- Formulate codes for good practices to guide food business operators at all levels of the food chain and conduct training on HACCP and hygiene rules, in line with the internationally accepted approach advocated by the Codex Alimentarius
- Actively participate in communicating with consumers and industry about issues on food safety, nutrition and GMPs. Analytical and sensory test reports on various food products need to be published on a regular basis to create awareness and demand for high quality food products.

7.5.4 Strengthening the infrastructure and coordination among food testing laboratories

According to the database of Indian Food Processing Companies (of about 5500 companies) compiled by CIFTI, almost 75% are in Delhi NCR, Eastern Punjab, Mumbai, southern Maharashtra, Bangalore, Mysore, and in and around Chennai. There is also sector-specific concentration such as Rajasthan and Kerala (spices); Delhi, Punjab, Gujarat and Maharashtra (dairy). The industry concentration should be taken into account for setting up new laboratories and upgrading existing laboratories.

In addition, all major seaports should have sophisticated laboratories. Currently, most laboratories at sea ports are not fully equipped to handle testing of imported products, organic foods, residual radioactive matter, new toxins and allergens, textural analysis, residues of veterinary drugs, enzymes and hormones and also GM content.

It is recommended to develop a three-tier food testing infrastructure – National, Regional, State / Local. The objective is to enhance the reach and usage of food testing laboratories as well as to optimize resources available. The state / local laboratories will be involved in routine testing. Regional laboratories will undertake testing requiring more sophisticated and skilled procedures / techniques / equipment / manpower. The national level laboratory will undertake only those tests which state and regional laboratories can not undertake or where there is a dispute in the results of the tests undertaken by regional / state laboratories.

The role, space, infrastructure, equipments, manpower, location etc. will vary as per the type of laboratory. The suggested roles by type of laboratory are as below:

	National	Regional	State / Local
Act as the referral laboratory in any matter of controversy on food standards and food testing procedures	✓		
Identify various level of testing requirements (in terms of accuracy, sophistication etc.) of the industry and allocate laboratories with matching infrastructure accordingly development of sophisticated analytical methods and equipment for detection of food adulterants and contaminants	✓		
Interaction with the CODEX Alimentarius Commission on safety evaluation of food additives, monitoring & surveillance of contaminants and preparation of inputs to the shadow committees of the National CODEX committee	✓		
Assist in obtaining NABL and international accreditation for Indian laboratories	✓		
Analysis of appeal for food samples received from various legal authorities and development of research reports		✓	
Analysis of imported food articles received from customs / port authorities and provide opinion and advice		✓	

Conduct proficiency tests under the National Accreditation Programme, audit the existing facilities periodically and suggest mechanisms to raise their quality control and analytical standards		✓	
Generation and analysis of data for setting/modifying standards for various food items			✓
Conduct training programmes for laboratories in the government and private sector on methods of food testing			✓

7.5.5 Training of players in the unorganized sector

It is essential to design special training programmes for players in the unorganised sector to upgrade their products and processes to comply with the stipulated quality/hygiene standards. Since most of the small and medium scale food processing units are located in clusters, a "cluster-based" training programme can be designed and implemented for optimal utilisation of resources.

7.5.6 Training of food inspectors

Training of food inspectors on GMP,GHP & HACCP should be made mandatory . In addition, food inspectors need to be informed of the latest developments in food standards, new products, and laboratory network. Food inspectors should be mandated to provide feedback to CCFS regarding issues with compliance / implementation of standards.

To summarise, the short term and long-term action plan with respect to food safety and hygiene is stated below:

- Develop and implement modern integrated food law
- Phase-wise approach for harmonization of Indian food standards with Codex.
- Develop institutional set-up which can provide scientific advice on all matters with a direct or indirect impact on food safety
- Training of players in the unorganized sector
- Training of food inspectors on GMP,GHP & HACCP should be made mandatory . In addition, food inspectors need to be informed of the latest developments in food standards, new products, and laboratory network.
- Develop a three-tier food testing infrastructure – The state / local laboratories will be involved in routine testing. Regional labs will undertake testing requiring more sophisticated and skilled testing procedures / techniques / equipments / manpower. National level laboratories will undertake only those tests which state and regional laboratories can not undertake or where there is dispute in the results of the tests undertaken by regional / state labs.

Chapter 8

Research & Development, Knowledge Management and Human Resources Development

This chapter discusses the current situation, the need gaps and suggests action steps in the area of Research & Development (R & D), Knowledge Management and Human Resources Development (HRD) in the food processing industry (FPI).

8.1. Research & Development

There is a dearth of downstream technologies for development of innovative food products and processes in spite of significant production advantages in agriculture coupled with a large domestic consumption base. The key to sustainable development of the food sector lies in the optimal use of science and technology, to conserve, preserve, process and distribute available food resources.

8.1.1. Current Status of R & D in various stages of Supply chain

The following section highlights the issues / need-gaps across the supply chain and provides global benchmarks as appropriate.

A. Pre Processing

Dairy

- There is scope for undertaking research to improve the productivity of milch animals. Low productivity and quality are the key reasons due to which processors in India, are not able to achieve the scale of operations of their counterparts in New Zealand or Australia.

Fruit and Vegetables

- *Mango* – Inspite of over 1500 varieties of mangoes grown in India, only 3-4 varieties are available at prices which render processing to be profitable. Further export-worthy varieties with higher shelf lives also need to be developed.
- *Orange* – Frozen Concentrated Orange Juice (FCOJ) is being imported for making juice, as suitable varieties for processing are not available in India.
- *Apple* – India is importing significant quantities to address consumer demand for specific attributes/varieties, which are not available in India.
- *Sapota* – There is potential to export sapota, if significant quantities of uniform-sized, firm fruit is available
- *Litchi* – There is need to identify varieties with higher shelf life, and smaller seeds
- *Potato* – As in the case of oranges, there is need to develop varieties which are suitable for processing into French fries / potato chips e.g with improved dry matter content

Oilseeds

- Indian oilseed yields are 50% of the global average and one-third of the world's best. This is one of the reasons which has led to high dependence on imports of edible oil to meet local consumption requirements.

Sugarcane

- Sugarcane yields in the largest producing state of Uttar Pradesh, are 40% lower than in Tamil Nadu. Higher cane yields can result in enhanced farmer incomes

Grain processing

- Low cost technology is required for upgrading flourmills in the unorganized sector – these have obsolete technology with higher consumption of energy and low recovery of finished products

Meat and Poultry

- Standardization is required in the size of eggs for exports
- There is need for detailed microbiological analysis of raw material used for making animal feed.
- Standardization of various factors such as bacteriological standards, preservation standards, additives, pesticide residue etc. of meat and meat based products is required.

Exhibit 8.1.1. A : Case study – F&V sector

In the F&V sector, the key handicap in the Indian research system is that the public research set-up has no connect/channel of communication with agencies that market the seeds / propagation material and also the agencies/retailers that actually market the output to the consumer. This leads to a disconnect between the market requirement and research. Further, the research bodies do not have the necessary infrastructure to market the new varieties to growers. Even if the variety is marketed, the institute is unable to support it with advice on crop management or post harvest practices. This is due to various reasons such as shortage of manpower in the state extension departments, and lack of training of these personnel. This is evident in the case of kiwi fruit where the Indian Government introduced the variety in the hilly terrains of North India; however in the absence of adequate support on cultivation practices, the domestic produce is much smaller than imported fruit and commands half the price as compared to the imported fruit.

Solution theme

Launch research projects in conjunction with select private parties who can support marketing tie-ups with farmers for the new varieties. This will ensure that farmers have access to an assured market for the new fruit/varieties.

Exhibit 8.1.1. B : International focus of research in pre-processing – Some Examples

- Cornell Institute of Food Science, Cornell University, USA is working on high pressure treatment of fluid milk as an alternative to pasteurization.
- Wageningen University, The Netherlands has developed a system for linking sensory properties of potatoes, fruits and vegetables to consumer preferences. This provides insights into consumer needs, thus enabling growers / processors to select the best varieties.
- The Centre for Dairy Research at Reading, UK (CEDAR) represents the largest facility in the UK for nutritional, reproductive and metabolic studies with dairy cows. The centre houses a 400-cow dairy unit, which is equipped to record individual feed intakes, as well as milk yield and milk composition for all cows; reproduction and health data for all cows are recorded on DAISY, the computerized Dairy Information System at the centre.

B. Product development and Manufacturing process

- India has a large repository of traditional foods which have a health benefit. There is a huge opportunity for developing and commercializing innovative forms of traditional Indian healthy foods with long shelf life for exports. e.g. ethnic beverages such as kokum, coconut water and ethnic food such as khakra, amla preserve etc.
- Given the increasing demand for global food products in India, there is a need to adapt these products to Indian preferences, using local raw materials. This requires a detailed

understanding of the Indian palate across regions and the role played by texture, rheology, mouth-feel and other related characteristics in making food appealing to consumers.

- Further, the impact of globalization and exposure of Indian consumers to international products along with the increasing role of Intellectual Property Rights (IPR) will increase competitive pressure on Indian companies. They would need to align their strategies in cognizance of global trends by developing appropriate products and packaging, in order to establish competitive advantage in the global marketplace.

Exhibit 8.1.1.C : International focus in the area of product development – Some Examples

Product Development

- Studies are being carried out for the use of lactic acid bacteria and their bacteriocins to control the development of microbial populations in perishable foods which can help develop high quality, minimally processed foods.
- Studies on canning techniques using enzymes to keep cooked vegetables crispy, development of enzymes that help cut cholesterol content of foods, maize-based enzymes that digest insoluble plant products, enzyme blends that act as bromate substitutes in baking applications etc. are underway.

Manufacturing processes

- There is an increased research interest in non-thermal food processing technologies backed by increased consumer demand for high quality and minimally processed additive and microbe free foods. Non-thermal technologies are being used for treating milk, processing fruit juices and also for killing microorganisms in eggs.

C. Packaging /Traceability

- Apart from the domestic market, emerging trends in the international processed food market offer tremendous export opportunities to the Indian industry. However, in order to ensure the quality and safety of food with fewer or no additives and preservatives, novel packaging technologies are required such as:

- Innovative modified and controlled-atmosphere packaging – This is particularly relevant for exports. For instance, a commercially viable controlled atmosphere / modified atmosphere technology for exporting mangoes to Europe, has yet to be developed.
- Active and intelligent packaging systems – These can monitor product quality and trace a product's history through critical points in the food supply chain so that the products meet requisite food safety standards.
- Sustained R&D efforts are required to develop packaging films that offer optimal barrier properties. This would extend product shelf life.
- Given the stringent parameters for evaluating food products globally, Indian institutes need to be equipped to handle detection of pesticides and other impurities as per global requirements e.g Cholesterol detection at zero ppm level (currently the minimum detection ppm is 8)

Exhibit 8.1.1.D: International research focus –Some Examples

Improvement of storage life of food products

- Use of titanium dioxide as a Food Safety tool *(University of Wisconsin at Madison, USA)*
- Role of ozone in fresh food sterilization *(Univeristy of California at Davis, USA)*
- Stabilization of milk fat for shelf-life extension. *(Department of Food Science, University of Massachusetts, USA)*
- Analysis of high pressure treatment of fluid milk as an alternative to pasteurization. *(Cornell Institute of Food Science, USA)*
- Calcium treatment to extend the shelf life of melons,
- Control hormone levels of tomato to optimize their life expectancy,
- Ultra-low blanching to increase the firmness of canned vegetables and maintain their shelf life.

Packaging

- Modeling of migration process of compounds from packaging material to the product (Agrotechnology and Food Sciences Group, Wageningen University, The Netherlands)
- Assessment of potential antimicrobial compounds for use in packaging materials. (Cornell Institute of Food Science, USA)
- Use of natural antioxidants in packaging materials for shelf life extension of combat rations (Department of Food Science, Rutgers University, USA)
- Oxygen-free packaging (TNO, The Netherlands)
- Biodegradable films made from pectin and starch
- Conductive inks developed for microwave packaging
- Silicon oxide films that improve oxygen and moisture barriers.

8.1.2. Gaps in R & D

A) Degree of synergy/association with other institutes in the country/internationally.

There is low coordination between the various R&D institutes in the country working in the area of Food Science and Technology. One of the reasons for the above is that these institutes fall under the ambit of different ministries. For instance, CFTRI is part of Council of Scientific and Industrial Research (CSIR) under the Ministry of Science and Technology, National Dairy Research Institute (NDRI) is a deemed university governed by Indian Council of Agricultural Research (ICAR) which falls under the ambit of Ministry of Agriculture, while National Institute of Nutrition (NIN) is governed by Indian Council of Medical Research (ICMR) which is under the Ministry of Health.

There is also limited interaction with leading global institutes in terms of exchange of faculty / research personnel or students. Interaction with global institutes is important, keeping in view the nascency of the Indian food industry. Global institutes work closely with industry compared to Indian institutes, leading to a higher degree of understanding of the latest trends in demand for foods and beverages. Global institutes have well-defined processes for working with industry. In countries with high research output like the USA, research in applied science and academic science is carried out in the same set-up. This allows for greater interaction between students, research personnel and industry, and leads to a more application-oriented approach.

Exhibit 8.1.2.A: Some Examples of Collaboration in R & D

Many global institutions build long term global partnerships through research collaboration and exchange programs.

- The Babcock Institute for International Dairy Research and Development, University of Wisconsin Madison, USA fosters research collaborations and exchanges with industry leaders, educational institutes, research institutes, etc. in many countries.
- In Mexico, a partnership established with the Institute Tecnologicoy de Estudios Superiores Monterrey-Campus Querétaro (ITESM-CQ) as a result of the University of Wisconsin's three-year grant under USAID's TIES/ENLACES program includes student study tours and internships in Wisconsin and Mexico, as well as planned training programs for dairy cooperatives in Mexico. It recruits international experts which helps facilitate international research projects. It also participates in research by exploring various aspects of dairy science, from food safety issues to cross-country comparison of dairy industries
- In Pennsylvania State University, the specific role of each faculty is clearly defined in terms of expectations from teaching, research and outreach. Each faculty member is expected to interface with industry and earn consulting revenues for the institute, a part of which is shared with the faculty on a case to case basis. Faculty are also allowed to undertake private consulting (without using any of the facilities of the department) upto a maximum of 1 day per week.

- The University of Massachusetts (U Mass) has a strategic research alliance with the industry, with membership fees being a source of revenue. The industry obtains access to research reports and can discuss their R&D related issues with the scientists at U Mass. This is often the starting point for specific consulting assignments.
- In the area of food research, TNO (Netherlands) generates 75 % of its revenues through contract research from leading corporates (52% of them are overseas clients).
- The Center for Advanced Food Technology (CAFT), University of Rutgers, USA has a technology extension program, serving as an incubator, wherein direct technical assistance is provided to SMEs in the areas of developmental manufacturing, quality assurance, leasing of space/equipment/personnel and training courses.

B) Extent of Commercialization of Indigenously Developed Products / Technology and Machinery

There is limited synergy between academics / teaching and research, leading to lack of adequate industry interface and also lack of high quality personnel. The low interaction with industry leads to limited focus on applied research. This in turn leads to low commercialization of indigenously developed technologies. Multinationals typically have an in-house global network of R&D professionals but are willing to explore working with Indian institutions for developing India-specific products and processes. However, the quality of R&D currently undertaken by existing Indian institutions is not in line with their requirements.

These companies utilize the research institutes mainly for routine testing such as basic product composition, trace metal analysis, pesticide and antibiotic residue testing etc. In most cases these tests are undertaken to validate internal research, thus highlighting the restricted usage of these facilities.

Further, most Indian institutes have a long-winded process for accepting new projects. The lead time for obtaining response from these institutes is high, which acts as a deterrent for industry to seek research expertise from these institutes.

C) Consumer / Market Knowledge

There is limited focus on comprehensive solutions while developing products/processes, taking into account the commercial aspects and the complexities across the supply chain. There is also a poor cataloguing and survey of Indian produce, their quality and understanding of specific issues related to these varieties.

Exhibit 8.1.2.B – Some Examples of Consumer Driven R & D

- Within the department of Agrotechnology & Food Innovations, Wageningen (The Netherlands), the support of the process of new product development, with the consumer/market as the starting point, is an important focus area. A combination of sensory and consumer research is carried out using techniques such as preference mapping. In addition, a home-use panel, Taste-Net®, of over 900 households is available for product testing in the home environment.
- New techniques are being developed for evaluating citrus fruit, including determination of sensory threshold for important flavor compounds and the correlation of information from sensory panels with qualitative data to help industry provide higher-quality products.

D) Quality of Research Personnel

- There has been a significant drop in the quality of people entering the R&D field. Many students prefer alternate careers which are found to be more fulfilling and remunerative. Many senior scientists have retired in the last 10 years in the leading institutions. However,

there has not been fresh intake of technical staff in large numbers.

8.1.2 Action plan

A. Central Government

- The Central Government should set up an apex institute for Research & Development in Foods & Beverages in India with the specific role of:
  - Undertaking applied R&D in frontier areas and developing world-class products, processes, equipment and packaging, through special "theme centres / centres of excellence" developed within this institute
  - Coordinating R&D being undertaken in the food sector by various institutes in the country.
  - Collaborating with agri-research institutions i.e. with ICAR to identify R&D required in pre-harvest areas which can benefit the food processing industry.
  - Assisting the Government in policy making on R&D
  - Being the "International Face of Indian Food R&D" - Collaboration with global institutes in the area of development and strengthening of Theme Centres, scientist exchange programs
- In addition to the above, the Central Government should continue to support private and public research institutions, through funding of research. It should ensure that information on utilization of these funds is in the public domain.
- Information on research-linked visits of various industry delegations to other countries, sponsored by the centre / state government should be available in the public domain. The action points from the meetings and follow up action should be monitored and documented

B. Research Institutions

- Research carried out at Indian institutes should be commensurate with the changing global scenario, keeping in view ever changing market needs and trends, and focus on developing products/processes/packaging to address these. e.g. development of packaged ethnic products for the overseas market, innovative packaging to cater to global and Indian markets etc.

- Indian research institutes need to engage in both fundamental research and applied research (developing new products / technology) focusing on industry needs. There is a need to carry out fundamental research for characterization of basic food properties (physical, chemical, taste, flavour, spoilage, microbial study) and work on technological innovations based on preferences of Indian consumers.
- Indian research institutions need to focus on process optimization, and scale up from lab to commercial scale which includes equipment and plant layout / design in a commercially viable manner.
- In the emerging scenario in global trade, it is extremely important for Indian institutes to protect the nation's interest by ensuring that patents are obtained for research carried out in the country.

8.2 Knowledge Management

8.2.1 Information availability – Current Status

The existing institutional framework in the country comprising of various Central/State government-run academic, research, extension institutions; industry associations and Corporates do build, collate and disseminate information or knowledge on various aspects of the agriculture and food supply chain. While research institutions predominantly offer specialized information on a specific subject, industry associations and ministries/departments offer information on relevant sectors. Some prominent institutions/bodies which offer information and knowledge pertaining to the food and agriculture sector are presented in Fig. 7.2.1 below.

Exhibit 8.2.1.A – Information available from prominent institutions / bodies in India

Institution/Body	Governing agency	Information available
Department of Agriculture and Cooperation (Website and Publications)	Ministry of Agriculture and Cooperation, Government of India	Programmes and schemes floated by the ministry; Farm produce prices, Statistics on crop acreage, production and productivity (state-wise and year-wise): Livestock and Fish production
Ministry of Food Processing Industries (Website and Publications)	Ministry of Food Processing Industries	Policies and regulations governing food processing industry, Industry specific information (sector-wise profiles, major players, market potential etc) R&D (new processing techniques, preservatives and agents), Investment opportunities including information on licensing regulation, funding etc for venture setup), Food health and food quality.
National Dairy Development Board (website and publications)	Autonomous	Livestock population; (state-wise, species- wise); Milk production and per-capita availability(state-wise) Milk consumption, Prices
Spices Board (website and publications)	Ministry of Commerce	International Spice Trade (item-wise, country-wise); Trade policy; Exporters list
APEDA (website and publications)	Ministry of Commerce	International trade of agriculture and processed foods; Importers and Exporters list; Financial assistance schemes; Food regulation in various countries: List of recognized labs
CFTRI	CSIR	Food Science and Technology Information Services (FOSTIS), the central library of CFTRI, and a major information resource centre with an extensive collection of books, periodicals, reports, CD ROM databases, standards, patents, theses and other intellectual materials from national and international sources. Journals · Food Science and Technology Abstracts (FSTA) · Chemical Abstracts (CA) · Journal Citation Report (JCR) · Indian Standards Database · Indian Patent Databases: (INPAT and EKASWA) · CFTRI Research Papers Database (on floppy diskettes)
Indian Institute of Horticulture Research	ICAR, Ministry of Agriculture & Cooperation	Post harvest practices for various horticultural crops
National Institute of Nutrition	ICMR, Ministry of Health & Family Welfare	Nutritive value of Indian foods,: Energy requirements of various demographic profiles; Anthropometric standards.

8.2.2 Information Needs

The key stakeholders in the food processing sector viz. "Industry players" (processors), "Policy makers", "Research personnel" and Consumers require specific information as detailed below.

A) Industry Players

The information required by industry players can be:

a) Product related information
b) Process related information
c) Market related information
d) Policy related information
e) Human resource related information

a) Product related Information

Regular information on new product launches, product composition and product innovation is required by the industry. Food safety related information especially on the prevailing national and international standards, list of approved and banned products and ingredients is also a key requirement.

Specific information requirement, however, depends on the type of business represented as indicated below in Fig 8.2.2.(A)

Exhibit 8.2.2.A: Illustrative list of product related information requirement

Business Represented	Information Need	Type of information	Frequency of requirement	Source(s) used
Food ingredients	New product related	Information on various ingredients used & new ingredients approved for use in seasoning, dehydrated vegetables	Once in a quarter	Food Ingredient Magazine & ASTA & IFT* websites
Food service	New product related	New products launch, products composition and any new technology innovation	Once in a quarter	Currently no source
Grains (export)	Product related	Information on procurement of organic Basmati	Half yearly	Currently no source
Animal protein	New Product related	Technology, formulations, additives	Monthly	International and Indian food science/ technology/ engineering/ marketing journals.

* ASTA – American Spice Trade Association, IFT – Institute of Food Technologists, Source:Survey of various stakeholders carried out by Rabo India

b) Process related Information

Process related information required by various players depends on the type of business involved in but can be broadly categorized as follows:

- Good Manufacturing processes, HACCP, national and international best practices
- Information on the latest processes developed at the national and global level, international and domestic turnkey project implementers, list of equipment manufacturers world wide (including cost estimates)
- Information related to latest packaging technologies and methods being employed, shelf life details, packaging design details etc

Exhibit 8.2.2.B Illustrative list of process related information requirement

Business Represented	Information Need	Type of information	Frequency of requirement	Source(s) used
Food ingredients	Packaging related	Shelf life enhancing packaging	Once in 6 months	Food and Pack Magazine & ASTA & IFT* websites
Food service	Manufacturing practices	GMP, HACCP, international and national best practices	Once in a month	Currently no source
Meat (exports)	Packaging related	Pack designs	Monthly	Food technology, Magazine, packaging design journals

Source: Survey of various stakeholders carried out by Rabo India

c) Market related Information

Information on demographics, consumer trends and consumption patterns in different markets (both domestic and international – for key export destinations, market opportunities in various countries, details on testing facilities and certification agencies in these markets are some of the key requirements of the industry.

Exhibit 8.2.2 C – Illustrative list of market related information requirement

Business Represented	Type of information	Frequency of requirement	Source(s) used
Non alcoholic beverages	Consumption trends	Once in 6 months	Food and Pack Magazine & ASTA & IFT* websites
Food ingredients	Emerging trends based on consumer surveys	Once a quarter	Food Ingredient Magazine & ASTA & IFT websites
Animal protein	New trends in marketing	Weekly	Market intelligence reports / market research reports / magazines / journals
Food service	Important events, trade forums, seminars	Throughout the year	CII, FICCI, HACCP Auditors

Source: Survey of various stakeholders carried out by Rabo India

d) Policy related Information

Information on tariff and non-tariff barriers for different product categories, information on food standards, especially on prevailing food safety requirements of each country (such as issues related to traceability, list of approved and banned products and ingredients etc) are the key requirements of processed food exporters.

Exhibit 8.2.2.D –Illustrative list of policy related information requirement

Business Represented	Information Need	Type of information	Frequency of requirement	Source(s) used
Animal protein	Food standards related	New developments in food standards, food safety issues with respect to food ingredients, additives etc.	Quarterly	FDA, EU, CODEX, BIS, Standards, their newsletters, food labeling journals
Food service	Food standards related	Change in food laws and customs notifications, issues in the markets, any recalls due to microbial out break	Once in a month	PFA bulletins
Spices (export)	Food standards related	New enactments	As & when they are enforced	customer interaction & relevant websites
Rice (export)	Varietal testing	DNA markers, DNA fingerprinting	Once in two months	Informal contact in Cornell university
Non alcoholic beverages	Food standards	Permissible levels of ingredients and additives	Once in a quarter	Relevant websites

Source: Survey of various stakeholders carried out by Rabo India

e) Human resource related Information

Information pertaining to training programmes, seminars, and workshops on different topics, and venues for the same; qualified technical manpower availability in different areas were ascertained to be the important requirements.

Exhibit 8.2.2 E – Illustrative list of human resources related information requirement

Business Represented	Type of information	Frequency of requirement	Source(s) used
Food service	Training, seminars & work groups	Throughout the year	CII, FICCI
Animal protein	Man power development productivity, production/ export / consumption data	Monthly	Management journals, HR journals, books export / import data

Source: Survey of various stakeholders carried out by Rabo India

B) Policy makers

Decision makers in the Government who are responsible for areas such as setting food standards for various food products, implementing legislation on IPRs; determining taxation on various food products &, devising appropriate financial assistance schemes require access to market related information such as:

Per capita consumption and average daily intake details of various processed food items

- Industry structure of the processed food sector (number, capacity, and percentage of unorganized vs. organized players in each sub-sector, competition within players etc)
- Cost of setting up processing units

Information is also required by policy makers to facilitate negotiations on bilateral and multilateral trade agreements in the international front. This information can be further categorized into:

- Various tariff and non tariff barriers imposed by different countries for different categories of food products
- Demand and supply trends for food products of significance in the context of global trade
- Logistical strengths / weaknesses of key competitors and exporters of food products to India
- Prevailing international standards on food safety for different products

C) Academicians, Researchers and Students

A key requirement of the faculty, researchers and students in food science and technology is the updated information on research programmes being taken up worldwide, the research facilities available and opportunities to work with specialized institutions on frontier research projects in various institutions and industries.

D) Consumers

As key stakeholders in the supply chain, there is a need for consumers to access factual information pertaining to the various positive and negative health effects of processed foods. Availability of relevant information can lead to increased consumption of processed foods which are healthful, thus addressing the existing apathy (and even antipathy) in consumer attitude on processed foods.

8.2.3 Need Gaps in Market Intelligence

- Though there are centres housing information and data, there is no single source of information for complete and updated knowledge pertaining to the food processing industry

to meet the needs of various stakeholders. For example, there is no format through which an entrepreneur can access information on the latest breakthroughs in food technology.

- Even when the information is available with an institution, it is often tedious and time consuming to access it.
- There is no easy access to information to exporters regarding the operating environment in international markets
- The subscription rates for international magazines and journals are high. The small and medium-sized players are unable to afford these and are particularly at a disadvantage.

The following case study on the Dairy sector illustrates the issues faced in the availability of information pertaining to the food sector.

Exhibit 8.2.3 – Dairy Case Study

Various stakeholders in the dairy industry have expressed their dissatisfaction with the quality of market information. Some of the issues raised are as provided below:

- There is no information available on month-wise, state-wise milk production.
- There is no reliable information on capacities of various dairy plants located in India.
- There are no sources which provide milk procurement prices for various milk belts.
- No price trends are available for key trade products such as SMP.
- Information on food standards of dairy products in the international markets is not available locally.
- There are no accurate figures on the size and growth of the ethnic dairy product segment in the Indian market.

8.2.4. Action Plan

A) Central Government

There is an urgent need for the Central Government through the Ministry of Food Processing Industries to take cognizance of the above need gaps in information and knowledge management. In order to facilitate growth and development of the food processing sector in the country, the following actions need to be taken:

Collection of Information: A dedicated information cell, constituted within the Ministry should collate all relevant information pertaining to the food processing sector, both at the national as well as international level. Specific stake holder information needs (detailed earlier in the chapter) need to be taken into account while compiling this information.

Information Presentation: The information collected needs to be updated in a standardized 'user-friendly' format keeping various stakeholders interests in view.

An Internet portal offering information structured around the following verticals will be an effective platform to present information.

Exhibit 8.2.4 – Suggested verticals for the Internet portal

Technology	Providing information related to the latest international technologies developed/being developed; list and details of various technology providers; cost estimates of various projects and technical components.
Safety and Standards	Information pertaining to permissible levels of various ingredients in foods, approved average intake levels, information on prevailing food standards (CODEX etc) across various countries for different categories of food, information related to various testing methods facilities available (both at the domestic & international level)
Supply trends	Information on production levels of various agri/food products of trade significance, varieties produced, pricing trends etc.
Markets	Information on consumption trends of various food categories across various markets, specific opportunities for exports.
Value added Services	In addition to the above, customized information/knowledge can be provided on a paid-for basis to prospective clients who need specific information.

B) State Governments

- The State Government through the various related Departments can provide the required information to MFPI.
- The State Government websites (across the FPI sector) need to be updated every month providing details of various schemes, policies, production estimates etc.

8.3 Human Resource Development (HRD)

8.3.1. Need for skilled manpower for FPI in India

The food processing industry in the country was dominated by basic processing segments such as paddy, flour and oil milling until a few years ago. However, with increasing consumer awareness of global trends on the one hand, and growing demand for convenience on the other, the industry has been under increased pressure to develop innovative products, packaging, delivery systems and processes. The advent of such new and improved food products has meant greater sophistication and modernization of food processing units, higher efficiency levels in performance, advanced research and development work and innovative marketing. This in turn has created the need for qualified workforce in each of these areas. The diverse scope of the food industry which spans the entire gamut of its various sub-sectors, such as grain milling, fruit and vegetable processing, fisheries, dairy processing etc., calls for specialized human resources with in-depth expertise in their focus areas.

The Food Processing industry offers various specialized positions for Food science and technology graduates which can broadly be classified as mentioned below

Exhibit 8.3.1.A – Specialized positions for Food Science and Technology graduates

Profile	Role
Production Managers or Supervisors	Manage food production and processing facilities.
Product Development Technologists	Assist in designing, researching, and developing new food products.
Food Engineers	Design and manufacture of machinery necessary for production of processed food that is safe and nutritious.
Food Microbiologists	Assess the microbiological safety of foods and use microorganisms to develop new kinds of foods
Quality Control Scientists	Inspect and determine the quality of food in one or more stages of manufacturing.
Research Technicians	Support Government and University scientists in performing food related research.
Technical Representatives	Provide technical support to sales people in food manufacturing or equipment manufacturing plants

8.3.2 Current state of infrastructure for education and training of entrepreneurs and professionals

It is estimated that there are about 170 institutions in India that impart education and training in various areas related to food science and technology. Based on the institutional set up, the prominent institutions imparting training programmes related to food science and technology can be broadly grouped as below.

Exhibit 8.3.2. A Technical courses / training programmes offered by leading Indian institutes

Institution	Governing Organization	Technical Courses/Training Programmes offered
CFTRI	CSIR	• M.Sc programme, Certificate courses, Short term training programmes
State Agricultural Universities (SAUs), NDRI, IVRI, CMFRI	ICAR	• SAUs – M.Sc and PhD programmes • NDRI – B.Tech, M.Sc and PhD programmes, Short term training programmes • IVRI – M.VSc and PhD programmes • CMFRI – M.F.Sc and PhD programmes
Jadavpur University, UICT, HBTI	AICTE and UGC (Technical and General universities)	• Jadavpur – B.Tech, M.Tech and PhD programmes • UICT – B.Tech, M.Tech and PhD programmes • HBTI – B.Tech and M.Tech programmes
IIT Kharagpur, IIT Mumbai, IIT Delhi	IITs' Council, an apex body established by the Government of India	• IIT – B.Tech, M.Tech and PhD programmes
PPRC	Ministry of Food Processing Industries	• PPRC – Diploma course and short term training programmes
IIP (Autonomous institute under the ambit of the Ministry of Commerce)	The governing board comprises members from industry and industry associations and nominees appointed by the Government of India.	• IIP – PG diploma, Distance education programmes, Short term training programmes
Food Processing Training Centres (FPTCs)	Ministry of Food Processing Industries	• FPTCs aim to develop skill and entrepreneurship particularly in F&V processing in rural areas. • The Ministry has provided assistance for setting up of 344 Food Processing Training Centre (FPTCs) until 31st March 2004.
Small Industries Service Institutes	Small Industries Development organization, Ministry of Small Scale Industries	• Provides skill development training in food products (presently for the bakery sector).
Industrial Training Institutes (ITIs) / Centres (ITCs)		• Impart training in bakery and confectionery, fruit and vegetable processing etc. In the country there are 1787 ITIs and 2804 ITCs, some of which offer courses relating to FPI.
The Community Food and Nutrition Extension Unit (CFNEU) of the Food and Nutrition Board	Department of Women and Child development, Ministry of Human Resource Development	• Organize education and training in fruits and vegetables preservation in collaboration with state agencies. The unit organizes two weeks' training courses in home-scale preservation of fruits and vegetables including food and nutrition, at a nominal fee.

The total annual output of qualified graduates and postgraduates in different disciplines of Food science and technology from various institutions is estimated at 5235.

8.3.3. Need Gaps in Human Resources Development

- There is absence of managerial talent with adequate technical background in Food Science and Technology for taking on managerial functions at the middle and senior management level. Human resources/ trained personnel with marketing skills, customer relationships, operations management skills, team building etc, will be required in order to identify new product opportunities, maintain close relationships with key customers and maximize efficiency in performance. **There is no institution in the country which offers a specialized 'techno-managerial' programme for the food processing sector.**

- The autonomous institutes such as the IITs have the flexibility of designing and updating the courses based on the current trends and industry requirement. In IITs, the respective 'course coordinators' are empowered to update the courses which is then approved by the Senate. The university departments on the other hand, (functioning either under AICTE, ICAR or UGC) update the courses through 'departmental committees'. Once a consensus is reached by the departmental committees, it is subsequently submitted to the board for approval. **It has been observed that the courses in university departments are not being updated regularly and are in most cases, outdated with respect to the present trends and industry requirement.**
- In Indian institutions, emphasis is lacking on imparting education / training on issues related to Food safety and Regulation, especially on emerging global trends in these areas.
- Though there are several entrepreneurship development institutions (EDIs) in the country, (at least one in each state) offering several entrepreneurship development programmes, there is no focused programme targeted at the food industry. **There is a strong need for entrepreneurship development programmes and specialized Management Programmes to meet the specific requirements of the food processing sector.**
- **Business incubation is a critical need to foster entrepreneurship in the food industry in India**. Incubators provide a nurturing environment to new businesses during their critical stages of development by facilitating development of a sound product concept, providing guidance on the appropriate technology to be used, providing / enabling access to financing thereby leading to a successful launch and providing other related services. Incubators typically offer facilities such as space, shared services and equipment and access to a wide range of professional, technical and financial programs. Business incubators can facilitate success of new businesses, which in turn can create new jobs and drive economic growth of the country. **At present, business incubation facilities for the Food Processing sector are not available in India.** Except for the Agri Business Incubator at ICRISAT, the few institutes that have set up business incubation centers in the last 2-3 years, have focused primarily on the information technology sector.
  - ICRISAT – Agri Business Incubator (ABI) – The Agri Business Incubator located at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a collaborative venture between ICRISAT and the Department of Science and Technology, Government of India. At ABI, entrepreneurs can develop commercial ventures using ICRISAT technologies. It has launched its commercial operations in March 2004 with the signing of collaborative agreements with two private sector clients.
- Faculty in the existing institutes offering courses in Food Science & Technology usually have a PhD in Chemistry / Life sciences or in various disciplines in Engineering. There are few instances where the faculty members in Food Science and Technology departments of various universities actually have a basic degree in Food Technology. **The teaching faculty in most of the Indian academic institutions studied has limited industry experience / exposure.**
- **There is a shortage of certificate holders and persons trained in short term courses**. The infrastructure at existing organizations like FPTC, ITIs, NCDC, NABARD etc., needs to be strengthened so that need-based, application-oriented courses can be organized.
- There is a clear need for **training for floor level / unskilled workers** especially in the areas of quality requirements and process know how.
- **There are no specialized institutes for R&D and for imparting specialized skills in bakery, confectionery**. At present, besides CFTRI, there are very few institutions which provide qualified manpower for these sectors. These sectors have significant potential for

development, and require qualified and trained manpower across levels for various products like biscuits, cookies, snack foods etc.

- At present, **education facilities for wine manufacturing in the country are not available**. There is an urgent need for providing qualified manpower for this sub-sector and reduce the manufacturing cost of wine so as to be competitive internationally.
- At present, CFTRI is the only institute to offer **courses in the area of food grain milling**. In view of the size and importance of this sector, it is essential that additional training courses be offered in this sector across locations.

- There is a need to introduce **courses for small scale players such as retailers, halwais** etc, who require training on latest hygiene practices, product quality improvement etc.

8.3.4 Action plan

A. Central Government

- **The Government needs to set up world class academic institution catering to the educational and training needs of human resource in the Food Processing Industry, which can undertake the following:**
  - Offer continual training to personnel of the industry to keep them abreast of latest technical developments and facilitate the relevance of high level curricula to industry
  - Serve as a nodal agency for assessing training requirements and formulating vocational training programmes to various semi skilled and skilled work force of the Food Processing Industry throughout the country
  - Design and offer specialized Management Programmes to meet the techno-managerial manpower requirement of the industry and foster entrepreneurship
  - Offer world class graduate and research programmes in all key FPI sub sectors to create a talent pool of international standards which can serve as global benchmarks for other institutes.
  - Help overcome local and regional variations in education by designing and updating course curricula for education pertaining to food science and technology.
  - Undertake socially relevant extension/outreach programmes for various governmental and non – governmental stakeholders
  - The institute can also serve as a apex information resource centre and also for standards, quality, accredition, certificate etc
  - Foster strong, well established linkages between the industry and various academic institutions so as to facilitate effective R & D and dissemination and commercialization of research findings.

B. Institutions engaged in HRD

- There is a need for more short term courses / training programs across sectors. This would also enable existing employees in the FPI sector to get updated with the latest trends / knowledge in their respective fields.
  - Existing institutes need to offer a wide range of courses especially in the areas of bakery, food grain milling, confectionery and wine making.
  - Certain training programs could be standardized by the apex training institute (proposed in section 7.3.4) and offered across locations. Students / entrepreneurs could attend these at a location convenient to them e.g. CFTRI, NIFTEM, UICT etc. If required, the

faculty from the apex training institute could conduct training programs at other institutes.

- The apex training institute could serve as a nodal agency for assessing training requirements and formulating vocational training programmes, to be offered by existing institutes, to various semi skilled and skilled work force of the Food Processing Industry throughout the country
- Existing organizations like FPTC, ITIs, NCDC, NABARD etc. need to be strengthened in terms of infrastructure, faculty, course contents etc., to make them more effective in promoting need-based training for the FPI sector. The proposed apex training institute could coordinate the course design, content for various training programs in the country, as also assess and advise on infrastructure upgradation as relevant.

- The proposed apex training institute could coordinate a structured training module for faculty of various institutes so that they are kept abreast of latest technical developments.

- The courses in university departments need to be updated regularly (atleast once in three years) so that they are in line with current industry trends.

8.4 Employment generation potential of Food Processing Industries

Food Processing has significant potential for employment generation not only directly but across the supply chain in production of raw materials, storage of produce and finished products and distribution of food products. For e.g. a grant of INR 66.7 million (total investment of approximately INR 250 to 300 million) to 35 units in UP in 2003-04 has resulted in direct employment of 2,500 and indirect employment of 20,000, with a significant rural component.

Employment intensity is significantly higher in the Small Scale Industries (SSI) sector as compared to the organized sector for the same level of investment.

Exhibit 8.4 A Comparison of employment Organized vs SSI sector in F&V processing

	Organized sector (Jams / Ketchup)	SSI sector (Pickles)
Fixed Investment	INR 10 Million	INR 0.2 Million
Output per year	500 tonnes	120 tonnes
Total Employment	140	21
Total employment for INR 10 Million of Investment	**140**	**1050**

Source: Rabobank Research

The incremental employment in the FPI sector by 2015 on the basis of the stated vision (stated in chapter 9) is estimated at 8 Million. The sectoral break-down is as follows.

Exhibit 8.3.6.B: Estimated incremental employment in various FPI sectors by 2015

	Incremental Employment ('000) by 2015		
	Direct	Indirect	Total
Fruits and Vegetables	550	2200	2750
Dairy	640	2550	3190
Meat and Poultry			
Meat	51	102	153
Poultry	20	27	47
Marine	37	165	202
Edible Oil (refineries)	3	11	14
Grains			
Rice milling	57	190	247
Flour milling	114	285	399
Breads	38	95	133
Biscuits	99	248	347
Snack foods	56	111	167
Pasta based foods	16	32	48
Sugar based products			
Sugar	43	86	129
Chocolates	2	10	12
Confectionery	16	56	72
Total	**1800**	**6400**	**8200**

Source –Rabobank research

8.4.1 SSI in Food Processing

The SSI Sector accounts for 95% of industrial units in the country, 40% of value added in the manufacturing sector, 34% of national exports and 7% of Gross Domestic Product (GDP). The SSI sector is the largest employment generator next only to Agriculture. It has been estimated that an investment of INR 1 million in fixed assets in the small-scale sector generates employment for forty persons and produces more than four million rupees worth of goods or services. The Food sector is a leading employer within SSI, providing employment to 480,000 persons (13% of SSI).

The SSI sector is less capital intensive with a high potential to generate employment. However, the efficiency of SSI units is impacted by the following:

- Lack of capital / credit
- Inadequate Training – technical / managerial
- Tools and technology (traditional and less efficient)
- Limited market knowledge (demand, food standards)

- **SSI's role in semi-processing**: The organized large-scale sector is focused on processed foods, where SSI cannot compete due to lack of marketing and distribution strengths. However, SSIs can play an important role in procuring from farmers and primary processing of produce to increase shelf life and make it available to processor/marketers who have access to the final consumer.
- **Need for product innovation and branding**: There is a strong need to provide necessary training and R&D support to SSIs to promote product innovation. Also, SSIs have limitations in terms of investments on brand development. There is a need to promote public private participation in supporting collective investment by SSIs in branding.

Chapter 9

Vision, Strategy and Action Plan

9.1 Vision 2015

To realize the vast potential of Indian agriculture by trebling the size of the processed food sector so as to enhance farmer income, generate employment opportunities and contribute to overall national growth by increasing

a) **the level of processing of perishables from 6% to 20%**
b) **value addition by 70% and**
c) **share in global food trade from 1% to 3%**

As per the stated vision, the market size for processed foods will increase from INR 4,600 bn to INR 13,500 bn by 2014-15 (at 2003-04 prices). The share of value added products in processed food consumption will grow from 38% (INR 1,800 bn) to 58% (INR 7,800 bn).

Exhibit 9.1 A : Potential for Processed Foods as per the Stated Vision (INR bn) at 2003-04 prices

	2003-04	2009-10	2014-15	Growth
Processed Food	4,600	8,200	13,500	10 %
Primary Processed Food	2,800	4,200	5,700	7 %
Value-added Food	1,800	4,000	7,800	15 %
Share of value added products in Processed Food Consumption	**38%**	**49%**	**58%**	

Source: Rabobank Analysis

As stated earlier, the vision is to achieve higher level of processing in perishables, increased value addition and higher efficiency. The vision for various sectors is as follows:

Exhibit 9.1 B: Vision: Increase in level of processing (Perishables)

	Level of Processing(%)			Value Addition (%)
	2003-04	2009-10	2014-15	
Fresh Produce/F&V	1.4	10	15	
Dairy**	13	25	30	10% (Milk Products)
Buffalo Meat	21	35	45	
Poultry	6	15	25	
Marine Products**	8	15	20	10% (Marine and Value added shrimp_

*pertains to organized sector

Exhibit 9.1C : Vision: Processed Products from non-perishables (growth per annum)

	Volume Growth Rate (%)		Value Addition (%) per annum)	
	Current	**2005-10**	**2010-15**	2005-15
Edible Oil	9	12	12	
Grains				
Rice milling	3	6	6	
Flour milling	3	6	6	
Breads	8	10	10	8
Biscuits	6	10	10	8
Snack foods	10	15	15	10
Pasta based foods	9	12	12	10
Sugar and Sugar based products				
Sugar	4	4	4	
Confectionery	7	12	8	8
Chocolates	13	15	13	5
Alcoholic Beverages				
Beer	7	15	12	
Wine		53	12	
Non-Alcoholic Beverages				
Tea - Domestic		1	2	6
Te a - Exports		1	2	10
Coffee				5
Malted beverages	7	10	10	6
Spices	8	8	8	6
Salt	8	8	8	3

With the above stated vision, the sector-wise market potential is as follows:

Exhibit 9.1D : Market Potential for Processed Foods as per the Stated Vision

	Market (INR billion)		
	2003-04	**2009-10**	**2014-15**
Fruits and Vegetables	49	290	550
Dairy	1160	2500	4400
Edible Oil	495	710	980
Meat and Poultry			
Buffalo Meat	20	50	86
Poultry	7	37	104
Non-Alcoholic Beverages*			
Tea	78	136	211
Coffee	23	33	42
Grain based products			
Rice milling	800	980	1150
Flour milling	520	650	760
Breads	38	95	198
Biscuits	69	182	393
Snack foods	29	150	486
Pasta based foods	8	36	102
Marine Products	70	173	377
Sugar and Sugar based products			
Sugar	240	320	390
Confectionery	12	30	70
Chocolates	8	25	59
Alcoholic Beverages			
Beer	41	110	193
Spirits	190	393	870
Wine	3	50	90
Pulses	400	605	810
Aerated Beverages	80	137	201
Malted Beverages	12	35	75
Spices	175	450	886
Salt	25	53	90
Total	**4,600**	**8,200**	**13,500**

Source: Rabobank analysis

In order to achieve the market potential, the investment required in capacity creation and setting up requisite infrastructure is INR 997 bn until 2015 (INR 597 bn in the period 2005- 2010 and INR 400 bn in the period 2010 and 2015). The sectoral break-down is as follows:

Exhibit 9.1 E Investment required to achieve the vision

	2005-10	2010-15	Total till 2015
A. PROCESSING			
Fruits and Vegetables	70	40	110
Dairy	217	101	318
Meat and Poultry			
Buffalo Meat	8	9	17
Poultry	1	2	3
Marine	16	64	80
Edible Oil			
Refineries	3	3	6
Non-Alcoholic Beverages			
Tea	53	15	68
Grains			
Rice milling	24	19	43
Flour milling	15	18	33
Breads	5	5	10
Biscuits	13	12	25
Snack foods	5	6	11
Pasta based foods	1	2	3
Sugar and Sugar based products			
Sugar	75	75	150
Confectionery	1	2	3
Chocolates	8	11	19
Alcoholic Beverages			
Wine	5	4	9
Sub - Total	520	390	910
B. OTHER INVESTMENTS - MARKET DEVELOPMENT AND INFRASTRUCTURE			
Market development fund	5	2	7
Food testing laboratories	2	1	3
Institution(s) for food technology/management	2	1	3
F & V - Auction market(s) / mandi upgradation	20		20
F & V - Variety Improvement	15		15
Dairy - bulk cooling	3		3
Oilseed Development Programme	30	6	36
Sub-total	77	10	87
Total	**597**	**400**	**997**

Source: Rabobank Analysis, pertains to organized sector

The source of funds will be a combination of investments by industry players, debt/equity from financial institutions, foreign direct investment and Government funding. The recommendations with respect to financing and investment as detailed in chapter 5 need to be implemented to achieve this investment target.

The investment required from the Government in various plan periods is estimated below:

Exhibit 9.1 F Investments required by the Government

Figures in INR billion				X Plan	XI Plan	XII Plan
Recommended investments	Investment Required	Share of investment by Government	Investment by Government	2006-07	2008-13	2014-15
A. Investment in Processing						
Fruits & Vegetables	110	20%	22	6	13	3
Dairy	320	20%	64	16	38	10
Edible Oils	6	20%	1.2	1.2		
Meat & Poultry	20	20%	4	2	2	
Marine Products	82	20%	16.4	4	10	2.4
Tea & Coffee	65	50%	32.5	25	7.5	
Wine	9	15%	1.4	0.7	0.7	
Sugar & Confectionery	172	10%	17.2	4	10	3.2
Grain based products	124	15%	18.6	4	9	5.6
Sub total	**910**		**177**	**63**	**90**	**24**
B. Other investments – Market Development and Infrastructure						
Market development fund	7	100%	7	3	3	1
Food testing laboratories	3	100%	3	1	1	1
Institution(s) for food technology/management	3	100%	3	1	1	1
F & V – Auction market(s) / mandi upgradation	20	80%	16	4	12	
F & V – Variety Improvement	15	50%	7.5	2.5	5	
Dairy – bulk cooling	3	50%	1.5	0.5	1	
Oilseed Development Programme	36	100%	36	10	26	
Sub total	**87**		**74**	**22**	**49**	**3**
TOTAL	**997**		**251**	**85**	**139**	**27**

9.2 Strategy and Action Plan

A **Nine-point strategy** is recommended to achieve the stated vision:

1) Adopt a demand-driven approach by aligning food processing with consumer needs
2) Increase affordability of food products by reducing costs through rationalization of tax regime and increasing supply chain efficiency
3) Enhance financing to the agriculture and food processing sector in a comprehensive manner given the intrinsic linkages of the two sectors
4) Improve food standards and safety systems through science-based setting of standards and strengthening of food testing network
5) Strengthen institutional framework to develop manpower and R & D capabilities to address global challenges
6) Increase competitiveness of small and medium enterprises by facilitating their access to best practices, technology, capital and marketing opportunities

7) Effective market development and awareness campaign to enhance the image of Indian food products, particularly overseas
8) Foster public-private partnerships for infrastructure creation and technology upgradation
9) Replicate successful Indian and international business models including cooperative models, in production, processing and marketing of food products

The cross-sectoral action plan is detailed below:

A. Supply chain interventions – Raw material, Storage and Infrastructure

- Promote direct processor-farmer linkages by appropriate modifications to the APMC Act
- Facilitate development of controlled temperature distribution (from farm to processing facility to retail outlet), set up pre-processing centres and pre-cooling facilities near farms and mandis, set up quality measurement and quality control infrastructure near farm gate, encourage investor friendly food parks, upgrade food processing clusters, modernise agriculture markets, warehouses and abattoirs.
- Develop Food parks to offer requisite infrastructure and services which include technology, financial assistance and tailor made services required for setting up of businesses, along with access to regional, national and international markets.
- Increase the availability of appropriate variety of raw materials at reasonable prices through increased productivity and efficient extension service centres, replicating successful models in the public and private sectors

B. Research and Development

❖ Government

- Set up an apex institute for Research & Development in Foods & Beverages in India to :
  - undertake applied R&D in frontier areas and develop world-class products, processes, equipment and packaging, through special "theme centres / centres of excellence" developed within this institute
  - coordinate R&D being undertaken in the food sector by various institutes in the country.
  - collaborate with agri-research institutions to identify R&D required in pre-harvest areas which can benefit the food processing industry.
  - assist the Government in policy making on R&D
  - collaborate with global institutes in the area of development and strengthening of research and education

❖ Research Institutions

- Research carried out at Indian institutes should be commensurate with the changing global scenario, keeping in view ever changing market needs and trends, and focus on developing products/processes/packaging to address these.
- Indian research institutes need to engage in both fundamental research and applied research (developing new products / technology) focusing on industry needs.
- Indian research institutions need to focus on process optimization, and scale up from lab to commercial scale which includes development of equipment and plant layout / design in a commercially viable manner.
- In the emerging scenario in global trade, it is extremely important for Indian institutes to protect the nation's interest by ensuring that patents are obtained for all frontier research carried out in the country.

C. Human Resources Development

❖ Government

Set up a world class academic institution catering to the educational and training needs of human resource in the Food Processing Industry

- Offer continual training addressing specific industry requirements
- Serve as a nodal agency for assessing training requirements
- Design and offer specialized management programmes.
- Offer world class graduate and research programmes in all key FPI sub sectors
- Help overcome local and regional variations in education by designing and updating course curricula for education pertaining to food science and technology.
- Foster strong linkages between the industry and various academic institutions so as to facilitate effective R & D and dissemination and commercialization of research findings.

❖ Institutions

- Development of entrepreneurship development programmes and specialized Management Programmes to meet the specific requirements of the food processing sector.

D. Market creation and market Intelligence

- Promotional campaign for consumers highlighting the benefits of processed foods (healthy, convenient, assured quality).
- Develop a strong market intelligence network to cater to the information needs of stakeholders

E. Food Safety and Hygiene

- Develop and implement modern integrated food law with single apex regulator
- Phase-wise approach for harmonization of Indian food standards with Codex, to the extent possible
- Develop institutional set-up which can provide scientific advice on all matters related to food safety
- Training of small and medium enterprises in the unorganized sector
- Training of food inspectors on GMP,GHP & HACCP should be made mandatory.
- Develop a three-tier food testing infrastructure – The state / local laboratories will be involved in routine testing. Regional labs will undertake testing requiring more sophisticated and skilled testing procedure / techniques / equipments / manpower. National level laboratories will undertake only those tests which cannot be undertaken by state and regional laboratories.

F. Exports of agricultural and food products

- Integrate schemes offered for export promotion through various Ministries and allied agencies such as APEDA, MPEDA, Coffee Board, Tea Board, Export Inspection Council, Ministry of Agriculture, Ministry of Food Processing etc.
- Encourage food testing laboratories in India to obtain accreditation from international agencies.
- Set-up independent world-class food testing and inspection infrastructure, particularly in clusters, with significant presence of exporters
- Devise an alternate system of processing grade product specifications based on internationally accepted norms.
- Promote aggregation of exports to meet the minimum order requirement of importers
- Expand the list of export products for certification by EIC
- Develop a strong market intelligence system to enable current and potential exporters to take rational decisions.
- Introduce certification zoning systems – pesticide-free zones, organic production zones, disease free zones to facilitate high value exports from India
- Promote certification for organic farming for different crops
- Build global brands on the back of India's strengths (Darjeeling tea, Basmati rice, Durum wheat, Alphonso mango)

G. Financing of the processing sector

❖ Central Government

Credit

- Amendment of Cooperative Act to allow private banks to lend to PACS
- Amendment of Warehousing Corporation Act to allow banks to lend for infrastructure creation
- Redefine role of Regional Rural Banks and amendment of the RRB Act for effective utilization of RRB setup
- Amend the Negotiable Instruments Act to introduce negotiability of warehouse receipts
- Creation of an appropriate legal environment to ensure ease in enforcement of security
- Facilitate development of a network of warehouses at appropriate locations
- Participate in Public Private partnerships through structured term lending for infrastructure development

Commodities Trading

- Allow mutual funds to participate in Commodity derivatives trade
- Institute mechanism for grading of various traded commodities
- Allow set-off of commodity futures trading against business profits/losses to enable farmers to participate in the exchanges
- Clarity on policy framework for import duties

FDI

- Single window clearance for FDI in Food Processing
- Ministry of Food Processing to undertake sector-specific campaigns, in conjunction with State Governments, to attract FDI

❖ State Government

Credit

- Abolition of stamp duty on agricultural loans
- Amendment of Land Ceiling Act to allow consolidation of landholdings for cultivation
- Amend APMC Acts to permit direct farmer processor linkages
- Empanelling Certification agencies at State level for gradation and certification for collateral based financing
- Provide seed capital for development of agri infrastructure projects

Other

- Minority equity participation in projects being set up in the State
- Location of food parks to take into account demand potential as well as availability of raw material

❖ RBI

Credit

- Permit banks to dispense with documentation for hypothecation for crop loans
- Amendment in Priority Sector lending
  - Include Food Processing in direct priority lending
  - Remove ceiling on quantum of financing to food processing units to qualify for priority sector lending
  - Remove ceiling on farm loans for direct finance
  - Include long term lending to agriculture in direct lending
- Monitor priority sector portfolios of banks every 6 months

Commodities Trading

- Amend Banking Regulation Act to permit Banks to undertake trade in commodity derivatives
- Amend FCRA 1952 to redefine commodities, to broaden the scope of the derivatives market and introduce options trading

❖ Banks

- Revise evaluation parameters for food processing companies

❖ Nodal Agencies

- Institute monitoring mechanism for projects assisted under schemes and grants

• Rigorous analysis to be undertaken by the funding body • In capital intensive projects, the interest can be capitalized and funded, so as to minimize cash outflows in the initial years of operation • In sectors, which are working capital intensive, the funding institutions should consider offering soft loans instead of grants • The quantum of financial assistance to a food park needs to be decided on a case- specific basis, depending on the infrastructure requirements across locations.
H. Taxation
• Zero excise duty on all food and beverage products (except foods with adverse health implications) • Zero state-level taxes (sales tax, octroi etc) on all food and beverage products (except spirits, wine and beer, and foods with adverse health implications) • Custom duty: Reduce peak custom duty on food processing and packaging machinery to lowest slab

Apart from the various cross-sectoral recommendations related to financing, R & D, HRD, market intelligence, food safety/ hygiene, exports, taxation and supply chain interventions, **sector-specific recommendations** are as follows:

A. Fruits and Vegetables
❖ Central Government
• Remove reservations for small scale in pickles, chutneys • APEDA and Ministry of Agriculture to jointly undertake a program to negotiate for removal of quarantine restrictions
❖ State Government
• Facilitate direct farmer processor linkages through modifications in APMC act • Commence standardization of statistical measurement techniques for measuring crop volumes, and set standards for release of timely data on crop production (past and projected) • Adopt auction model of marketing in at least 1 mandi per state • Introduce new varieties, in conjunction with private sector players
Other
• Airlines needs to abolish the fuel and war surcharge on air freight rates
B. Dairy
❖ Central Government
• Training of the unorganized sector through state / district level bodies, cooperatives, ITIs on food standards, regulations, testing, cost-efficient processes etc. for quality improvement. • Offer financing schemes through nodal agencies to promote bulk cooling and storage • Promotion of dairy exports in milk deficit markets • Catalyse R & D for commercialization of indigenous products • Impetus on research and extension for livestock development and improving productivity of milch animals (along with state cooperatives)
❖ State Government
• Develop milk testing infrastructure at village level
C. Edible oil
❖ Central Government

- Increase area under oilseed production, extend direct income support to farmers cultivating oilseeds
- Leverage potential of rice bran oil by increasing production of edible grade rice bran oil from 0.48 mn tonnes to 0.7 mn tonnes
- Augment the availability of vegetable oils from tree borne oilseeds from 0.15 million tonnes to 0.30 million tonnes by increasing existing collections, and through establishment of compact plantations of tree borne oilseeds in wasteland and other lands
- Remove SSI reservation for crushing of Rapeseed/ Mustard, Groundnut and Safflower
- A clear framework needs to be established for deciding duties / duty differentials
- Make it mandatory for all state governments to enforce the Edible oil Packaging order
- Remove special incentives for new capacity creation

- Guard FTAs adequately to prevent creation of uneven playing field for domestic industry
- Allow blending of more than two oils and allow blended oils to be sold in consumer packs of upto 15kg
- Increase oilseed yields from current 1.07 tonnes / ha to 1.4 tonnes / ha by 2015 by
  - Enhancing area under irrigation from 23% to 30% by 2010
  - Developing high yielding, early maturing and pest/disease resistant varieties of oilseeds with more oil content suitable for different agro climatic zones of the country

❖ State government

- Enforce the Edible oil Packaging order
- Increase area under irrigation for oilseeds from 23% to 30%
- Increase the area under oil palm cultivation to 200,000 ha by 2015 with major focus on Andhra Pradesh, Karnataka and Tamil Nadu.
  - A Price Stabilization fund is recommended to protect farmers from declines in FFB prices
  - Promote intercropping to make oil palm plantation more sustainable and economically viable.

D. Meat and Poultry

❖ Central Government

- Reduce in-quota tariff rate on maize to 0% available to actual users
- Ban on rearing buffaloes for slaughter needs to be removed explicitly
- MFPO needs to be amended to cover meat as well as meat products and align it with Codex and OIE standards
- Relevant poultry insurances schemes need to be introduced
- Develop and propagate fast growing breeds of animals suitable for different agro climatic conditions for higher production

❖ State Government

- Ban street side slaughter of all small animals in all metros.
- Privatise all municipal slaughter houses; while laying down strict conditions to ensure hygiene
- Lay down strict timelines within which clearances for private slaughter houses are to be provided

E. Fisheries

❖ Central Government

- Assessment of deep sea resources
- Long term leasing of coastal zones to private sector players
- Promote import of raw material/ingredients and local value addition through requisite changes in duty structure
- Registration of all aquaculture units with MPEDA
- Ensure requisite surveillance of coastal waters

❖ State Government

- Enforcement of fishing holidays
- Regulation of mesh size
- Restrict number of fishing vessels operating in the EEZs
- Financing schemes for upgradation of fishing vessels, investment in equipment etc.
- Promote tuna fishing
- Enhance availability of quality brooder stock
- Education of farmers to adopt sustainable fishing and culture practices
- Facilitate development of cluster model for inland fisheries

F. Tea

❖ Central Government

- Promote cultivation of orthodox tea for exports, by reimbursing 50% of the cost of required modifications in processing facilities to shift from CTC to orthodox
- Estate specific promotion by the Tea Board for select estates
- Remove import of tea from the purview of FTAs, with other tea producing countries
- Government Scheme to support upgradation of tea estates

❖ State Government

- Modify statutory requirements for adherence to employment norms as per the Plantation Labour Act
- Parity in taxation with other corporates, through modification of agricultural income tax
- Promotion of cluster models for small growers

G. Coffee

❖ Central Government

- Provide subsidy on option premium for an initial period of 2 years
- Amend the PFA to permit use of flavours in coffee as additives
- Regularise the transport subsidy on coffee exports

❖ State Government

- State land ceiling / land grant rules in Karnataka, Tamilnadu and Kerala need to be amended to permit the estates to increase area under crops other than coffee
- Modify Plantation Labour Act (as above for tea)
- Parity between AIT and CIT rates, and modes of computation
- Depreciation allowance should be provided on coffee plantations
- Scrap purchase tax on coffee in Karnataka

H. Wine and Beer

- Increase area under wine grape cultivation
- Market development efforts to promote Indian wine in overseas markets
- Training/education for wine industry
- Shift to free market distribution, and remove controls on pricing

I. Confectionery
❖ Central Government
• Aid research for base gum and gum related products • Promote India as a sourcing hub for confectionery products
❖ State Government
• Establish rational market-driven cane pricing policy based on linkage between input and output cost • Decontrol of the sugar sector with removal of levy and quota systems • Promote intercropping of Cocoa with cultivation of coconut, arecanut etc. to supplement farm incomes • Assist in price hedging mechanism for sugar and cocoa, through part subsidies for premium of options traded in international exchanges
J. Grain based Products
❖ Central Government
• Restrict Government procurement to requisite quantities for buffer stock and public distribution • Financing of storage facilities at farm level. • Standardized grading system to be formulated and implemented • Encourage corporate traders and Multi-commodity exchanges which could replace mandis. • MSP system of procurement to be replaced with Income support system routed through Kisan Credit Cards • Focus on productivity improvement in durum wheat
❖ State Government
• Remove restrictions on the storage and movement of food grains

APPENDICES

Appendix # 1: Constitution of Committees

committee	Chairperson	Members	Corporates	States	Institutions
Fruits and vegetables	JS (MFPI)	CIFTI, APEDA, NHB	Pepsi, Mother Dairy, Dabur	Maharashtra Karnataka Uttar Pradesh, Bihar	IIHR, CFTRI
Meat and Poultry	JS (Dept of Animal Husbandry)	All India Meat & Livestock Exporters Association	Venkateshwara Hatcheries, Allana, Godrej Agrovet, Sugana, Al Kabir	Meat (UP, West Bengal, Maharashtra) Poultry (AP, Punjab)	IVRI
Dairy	JS (Dept of Animal Husbandry)	Indian Dairy Association	NDDB, Mother Dairy, Dynamix, Modern Dairy	Gujarat, Punjab, Delhi	NDRI
Edible oils	JS (Do Foods and Public Distribution)	Solvent Extractors Association, COOIT	Cargill, Agrotech, Ruchi, Dhara, Marico, Adani Wilmar	AP, Gujarat, West Bengal, Madhya Pradesh, Rajasthan	TMOP, ICAR
Grains	AS (Dept of Agriculture and cooperation)	Indian Flour Mill Association	Cargill, ITC, Britannia	UP, Bihar, Tamil Nadu, MP, Rajasthan	CFTRI
Alcoholic Beverages	JS (Chemicals and Petrochemicals)	Wine producer's association, Distiller's association, CIABC, ISWAI	UB, SWC, Sula, Grover, Bacardi,UDV	AP, Karnataka, Maharashtra, HP	
Non-alcoholic beverages	JS (MFPI)	Tea Board, Coffee Board	Tata Tea, HLL, Nestle, Pepsi, Coca Cola,	NEC, Tamil Nadu, Karnataka, Maharashtra	
Fisheries / Marine	JS (Dept of Animal Husbandry)	MPEDA, Sea food Exporters Association	ITC, HLL, Devi Marine, Kalyani Marine, Sandhya Marine	West Bengal, AP, Tamil Nadu, Kerela	CIFT, CMFRI, Centre Institute of Fisheries Education, Centre Inland fisheries Institution
Exports	Chairman (APEDA)	APEDA, FIEO, All India Rice Exporter Association	ITC, Cargill, Kejriwal and Company, Satnam Overseas	Rajasthan, Haryana, Maharashtra and Punjab	IIFT
Small and unorganized sector	JS (Rural and Agro industries department)	DC (SSI), SFAC, SIDBI, KVIC and SEWA		MP, Chattisgarh, Jharkhand	SISI
Foreign investment	JS (DIPP)	Indo American Chamber, Indo European Chamber, Indo Japan Chamber, Apeda, French Embassy, British High Commision	Nestle, Coca Cola, Pepsi, Cargill		
Taxation	CIFTI	CIFTI	Cadbury's, Haldiram's HLL, Coca Cola, GSK		

Appendix # 2: List of Government Bodies who have provided inputs for the report

- Agricultural Products Export Development Authority, Ministry of Commerce
- Central Board of Excise and Customs, Ministry of Finance
- Coffee Board, Ministry of Commerce
- Central Food Technology Research Institute, Mysore
- Department of Chemical and Petrochemicals, Ministry of Chemicals and Fertilizers
- Department of Agriculture and Cooperation, Ministry of Agriculture
- Department of Animal Husbandry and Dairying, Ministry of Agriculture
- Department of Foods and Public Distribution
- Defense Food Research Laboratory, Mysore
- Directorate of Vanaspati, Vegetable Oils and Fats, Delhi
- Department of Industrial Policy and Promotion, Ministry of Commerce
- Indian Institute of Horticultural Research
- Industries Commissioner, Govt of Madhya Pradesh
- Ministry of Agro and rural Industries
- Ministry of Health and family Welfare
- Marine Products Export Development Authority, Ministry of Commerce
- National Agricultural Cooperative Marketing Federation of India Ltd
- National Horticulture Board, Ministry of Agriculture
- National Cooperative Development Corporation
- National Dairy Research Institute, Karnal
- National Research Centre, Soybean (Indore)
- Office of commissioner of Industries, Govt of Delhi
- Office of Excise Commissioner, Govt of Andhra Pradesh
- Office of Excise Commissioner, Govt of Delhi
- Office of Excise Commissioner, Govt of Karnataka
- Office of Excise Commissioner, Govt of West Bengal
- Office of Excise Commissioner, Govt of Maharashtra
- Maharashtra State Agri Marketing Board
- Planning Commission
- State Departments for Agriculture/Food Processing
  - Maharashtra
  - Goa
  - Karnataka
  - West Bengal
  - Uttar Pradesh
  - Tamil Nadu
  - Kerala
- Tax Research unit, Ministry of Finance
- Tea Board, Ministry of Commerce

Appendix # 3: List of Companies and Associations Contacted

Companies

- Adani Wilmar
- Agrotech Foods Ltd
- Al Kabeer
- Allanasons
- Allanasons
- Allied Domeq
- Amalgamated Bean Coffee Trading Co.
- Amrit Banaspati
- Anmol Biscuits
- Arambagh
- Arambagh hatcheries
- Assam company Ltd
- AVT Mc Cormick
- Balanoor Plantations & Industries Ltd
- Britannia
- Cargill
- Coca Cola
- Cothas Coffee
- Creamline Dairy
- Danisco
- De Laval
- Desai Brothers
- Dhara Vegetable Oils and Foods Company (DOFCO)
- DSM
- Duncans
- Dynamix Dairy
- Eurofruits
- Foodcert India Pvt Ltd
- Foods & Inns
- Godrej Agrovet Ltd
- Godrej Industries
- Godfrey Phillips
- Grover Vineyards
- GSK
- Flex Foods
- Guinness UDV
- Haldiram's
- Hatsun Dairy
- Heritage Foods
- Hind Agro
- Hindustan Lever

- ITC
- Indage
- Indo Nissin
- Kejriwal and Company
- KRBL
- Maersk
- Marico
- McCain Foods
- Modern Dairy
- Mother Dairy
- Narasus Flour Mills
- Nestle
- Palm Tech India
- Paras Dairy
- Pepsi
- Poonjiajis
- Radhakrishna Foodland
- Radico Khaitan
- Ruchi Soya
- Seagrams
- Satnam Overseas
- Suguna Poultry
- Sula Wines
- Suri Fruit Agency
- Tata Coffee
- Tata Tea
- Tetrapak
- Triumph Distillers
- The Malt Company
- United Breweries
- Usha International
- Venkateshwara Hatcheries
- Vista Processed Foods
- Warren Tea
- Yupaa

Associations

- All India Bread Manufacturers' Association
- All India Roller Flour mill Association
- CAIBC
- CLFMA
- Central Organisation for Oil Industry and Trade (COOIT)
- Confederation of Indian Food Trade and Industry (CIFTI)
- Confederation of Indian Industry (CII)

- Federation of Biscuit Manufacturers' of India
- Indian Coffee Marketing Co-operative Ltd.,(COMARK)
- Indian Coffee Trade Association
- Indian Dairy Association
- Indian Vanaspati Producers Association (IVOPA)
- International Spirits and Wine Association of India
- Karanataka Coffee Brokers
- Karnataka Growers Federation
- Karnataka Planters Association
- Poultry Processors Association
- Solvent Extractors' Association of India (SEA)
- Soybean Processors Association of India (SOPA)
- United Planters' Association of Southern India (UPASI)
- US Grains Council

Appendix # 4

List of Farms, Processing Units, Institutions, Retailers Visited

Farms / Wholesale Markets

- Azadpur Mandi, Delhi
- Vashi Mandi, Mumbai
- Orchards (Banana, Pomegranate, Citrus, Mango)- Bangalore, Chittoor
- Safal Auction Market, Bangalore
- Tea Plantations, Munnar

Institutions / laboratories

- CCMB, Hyderabad
- CFTRI, Mysore
- DFRL, Mysore
- FRAC, Delhi
- Indian Institute of Packaging, Mumbai
- IIT, Mumbai
- IIT, Delhi
- National Dairy Research institute, Karnal
- NIN, Hyderabad
- IICT, Hyderabad

Packing/Processing facilities

- Amrit Banaspati, Ghaziabad
- Eurofruits
- Dynamix Dairy Industries
- Modern Dairy, Karnal
- NDRI Dairy Plant, Karnal
- Packhouses – Grapes – Nashik

Food Retailers

- Big Baazar (Delhi, Mumbai, Kolkata)
- Food World (Bangalore, Chennai)
- Giant (Hyderabad)
- Metro (Bangalore)
- Safal (Delhi)

Cold Storages

- Units on Delhi Haryana Border

Appendix # 5

Secondary Sources for Information

- All India Distillers Association Publication
- APEDA
- Census, 2001
- CFTRI
- Chicago Board of Trade (CBOT)
- Coffee Board
- DFRL
- Directorate of Vanaspati, Vegetable oils and Fats (VVOF)
- Federation of Biscuit Manufacturers' of India
- Food and Agricultural Organization (FAO)
- International Coffee Organisation (ICO)
- Ministry of Agriculture
    - Department of Agriculture & Cooperation, Directorate of Economics & Statistics, Agricultural Statistics Division
    - Department of Animal Husbandry and Dairying
- Ministry of Food Processing Industries
- Chicago Board of Trade (CBOT)
- United Nations Statistics Division
- MPEDA
- National Council of Applied Economic Research (NCAER)
- National Horticultural Board (NHB)
- National Sample Survey Organization (NSSO)
- National Dairy Research Institute (NDRI)
- Scotch Whisky Association
- Solvent Extractors Association of India (SEA)
- Tea Board
- United States Department of Agriculture (USDA)
- United Nations Statistics Division

Appendix # 6: Description of Products

Cereals: Rice, chira, khoi, lawa, muri, other rice products, wheat/atta, maida, suji, rawa, sewai, noodles, bread (bakery), other wheat products, jowar & products, bajra & products, maize & products, barley & products, small millets & products, ragi & products

Cereal substitutes : tapioca, jackfruit seed etc.

Pulses and pulses products: arhar (tur), gram (split), gram (whole), Moong, Masur, Urd, Peas, soyabean, Khesari, other pulses, gram products, besan, other processed pulse products

Milk and milk products: liquid milk, baby food, condensed powder, curd, ghee, butter, ice-cream other processed milk products

Edible oil: vanaspati, margarine, mustard oil, groundnut oil, coconut oil, edible oil (others)

Egg, meat and fish: eggs, fish, prawn , goat meat/mutton, beef/ buffalo meat, pork ,chicken, others (birds, crab, oyster, tortoise, etc.)

Vegetables: Potato, onion, radish, carrot, turnip, beet, sweet potato, arum, pumpkin, gourd, bitter gourd, cucumber, parwal / patal, jhinga / torai, snake gourd, papaya (green), cauliflower, cabbage, brinjal, lady's finger, palak/other leafy vegetables, french beans and barbati, tomato, peas, chillis (green), capsicum, plantain, green), jackfruit (green)\, lemon (no.), other vegetables

Fresh Fruits: banana (no.), jackfruit, watermelon, , Pineapple(no.), coconut (no.), guava, singara, orange, mausami , papaya, mango, kharbooza, pears (naspati), berries, leechi, apple, grapes, other fresh fruits

Dry Fruits: coconut (copra), groundnut, dates, cashewnut, walnut, other nuts, raisin (kishmish, monacca, etc.), other dry fruits,

Sugar : sugar, gur and honey

Spices: turmeric , black pepper , dry chilies, garlic, tamarind, ginger , curry powder, oilseeds , other spices

Beverages and snack foods: tea, coffee, cold beverages: bottled/canned ,fruit juice and shake , coconut: green , other beverages (cocoa, etc.), biscuits, salted refreshments, prepared sweets, cooked meals (no.), cake, pastry, pickles (gm), sauce (gm), jam, jelly (gm), other processed food

Appendix # 7: Urban and Rural Consumption of Food Products

A. Urban Consumption (INR bn)

Products	1996	1997	1998	1999	2000	2001	2002	CAGR (%)
Cereal	240	269	287	350	343	335	361	7.0
Gram	2	4	4	3	3	3	4	10.0
Cereal substitutes	1	1	1	1	2	1	2	9.7
Pulses & their products	56	57	63	80	75	76	82	6.6
Milk & milk products	172	197	208	246	258	260	280	8.4
Edible oil	76	74	82	89	85	92	112	6.8
Meat, fish and eggs	58	61	71	89	94	88	97	8.9
Vegetables	92	96	115	146	142	155	173	11.1
Fruits (fresh)	32	36	38	55	52	50	58	10.2
Fruits (dry)	7	9	9	13	13	14	20	18.4
Sugar	36	39	41	46	48	48	49	5.3
Salt	3	3	4	5	4	5	5	10.5
Spices	30	33	36	59	47	49	53	10.0
Beverages, etc.	111	127	135	180	196	202	246	14.2
Food total	**916**	**1005**	**1096**	**1362**	**1364**	**1378**	**1541**	**9.1**

Source: NSSO data and Rabobank analysis

A. Rural Consumption of Food Products (INR bn)

Products	1996	1997	1998	1999	2000	2001	2002	CAGR (%)
cereal	654	714	729	912	848	850	846	4.4
gram	5	7	6	5	5	6	6	3.4
cereal substitutes	2	2	3	3	3	3	3	8.9
pulses & their products	105	122	116	157	145	150	152	6.3
milk & milk products	264	325	306	360	368	373	396	7.0
edible oil	129	132	138	154	145	163	186	6.3
meat, fish and eggs	89	97	106	137	152	149	160	10.2
vegetables	159	174	203	254	251	293	308	11.6
fruits (fresh)	34	43	38	58	64	59	64	11.1
fruits (dry)	7	12	9	12	14	14	15	13.4
sugar	73	89	85	98	100	98	97	4.8
salt	6	6	7	9	8	9	9	7.6
spices	64	71	70	113	93	99	100	7.7
beverages, etc.	104	121	126	172	189	195	214	12.9
food total	**1695**	**1916**	**1943**	**2444**	**2384**	**2460**	**2556**	**7.1**

Source: NSSO data and Rabobank Analysis

Appendix # 8: Per Capita Consumption of Food Products by States

State	Per capita Expenditure (Rs.)
AP	4074
Assam	4264
Bihar	3272
Gujarat	4795
Haryana	4726
Karnataka	3847
Kerala	5558
MP	3099
Maharashtra	4336
Orissa	3073
Punjab	4698
Rajasthan	4019
TN	4191
UP	3466
WB	4243
India	4016

Source: NSSO and Rabobank Analysis

Appendix # 9: Market Estimation using Gross output / Value Addition in FPI

A. Gross Output

The value of output from the food processing sector as per CSO data is about INR 1,800 bn (2001-02 at factory cost). The contribution of the organized sector is about INR 1,450 bn and of the unorganized sector is about Rs. INR 350 bn.

Exhibit 1: Market Estimation using Gross Output Value in Food Processing Industries

Oragnised Sector Data			Unorganised sector Data			Total
Code	Product	Output (INR bn)	Code	Product	Output (INR bn)	
1511	Meat & Poultry	11.10	11	Dairy, Meat, Poultry, Marine	66.98	
1512	Marine	30.55	12	F & V, Cereals, Pulses	168.57	
1513	F & V	16.24	13	Others	96.30	
1514	Oil	312.53	15	Beverages / Tobacco	17.41	
1520	Dairy	191.54				
1531	Grain Milling	330.28				
1541	Bakery	36.91				
1542	Sugar	259.40				
1543	Chocolate & Confectionery	15.57				
1544	Macaroni Noodles	1.76				
1549	Others	148.71				
1551	Spirits	39.19				
1552	Wine	11.15				
1553	Beer	20.22				
1554	Aerated / Mineral	30.42				
		1455.57			349.26	1804.83

Source: Annual Survey of Industries, 2001-02, CSO for organized sector data, NSS Report no. 480: Unorganised Manufacturing Sector in India, 2000-2001: Input, Output and Value Added; NSSO for unorganized sector

Assuming 7 % growth, the gross output value for 2003-04 is about INR 2,100 bn.

B. Value Addition

Exhibit 2: Market Estimation using Value Addition in Food Processing Industries (2003-04 at factory cost)

Figures in INR bn

Value Addition in Food Processing (A)	520
Agr. Raw Material Consumed in Food Processing (B)	1950
Other inputs in Food Processing(C)	455
Agr Processed Output at FC (A + B + C)	2925
Exclude	
pan & other intoxicants	78
tobacco & its products	415
hotels & restaurants	269
Sub-total	763
Processed Food Output	2,160

Source: Trend Analysis from NCAER Expert

- Assuming a mark-up of 60% (taxes, transportation, distributor margins, storage), the food sector's market size is approximately INR 3,300 bn.
- The value of output from unorganized sector in dairy (halwais) and grains (chakkis) needs to be added to arrive at the total output from processed food sector.

Exhibit 3: Total output from processed food sector

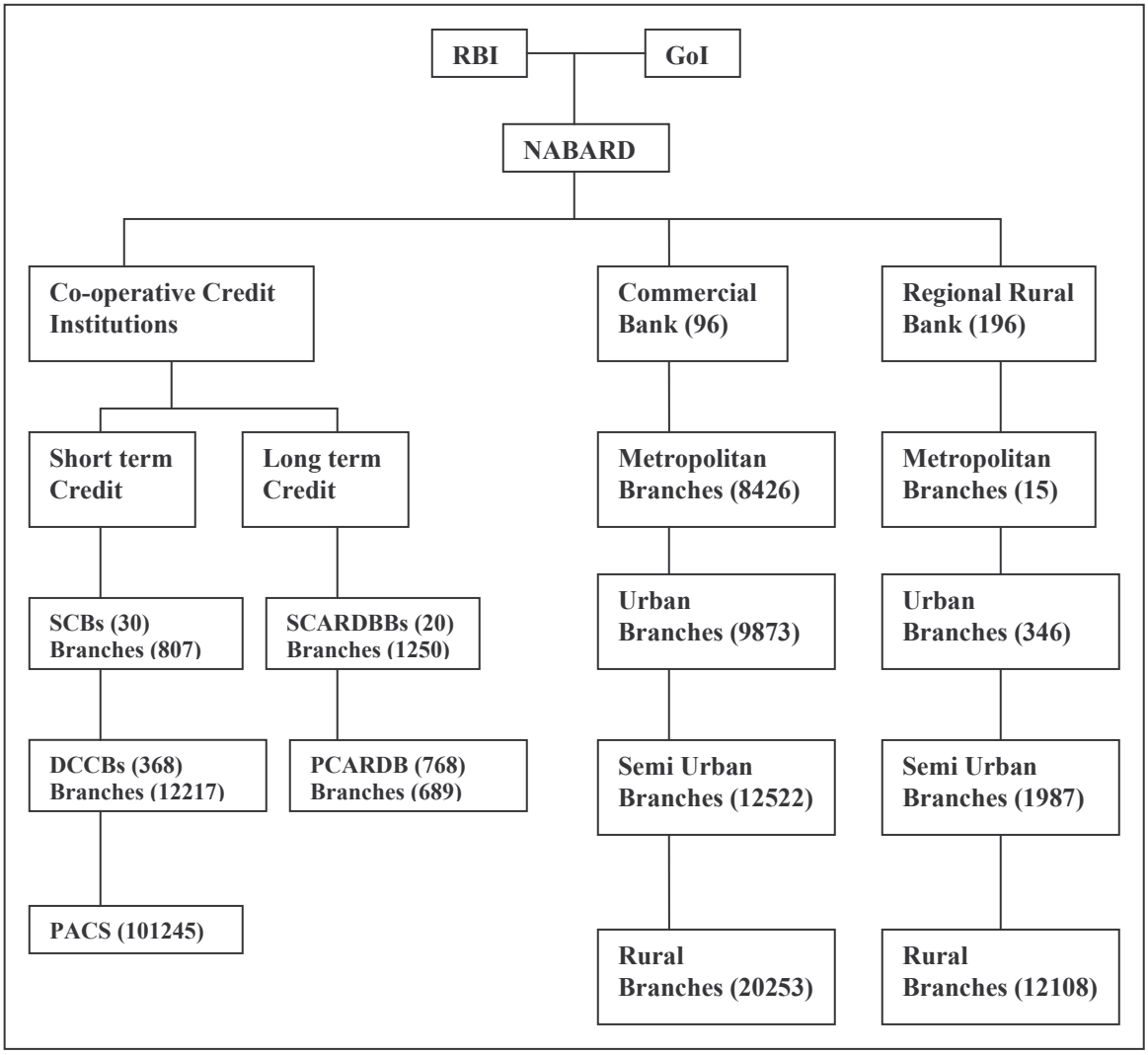
Output from FPI at market price	INR 3,300 bn	Remarks
Add		
Processing in unorgnaised sector in dairy (halwai)	INR 906 bn	20 million tonnes at average price realization of INR 45,400 per ton
Processing in unorganized sector in flour milling (chakkis)	INR 382.5 bn	42.5 million tonnes of milled product with average realization of INR 9,000 per ton
Total Value of Processed Foods	INR 4,600 bn	

Appendix # 10: Brief profiles of organised food retailers

Format	Brands	Group	Number of stores* (Approximate)	Estimated Turnover* (INR Million)	Locations
Neighbour -hood Store	Margin Free (Discounter)	Margin Free	215	5,500	Kerala
	Safal	Mother Dairy	279	1,000	Delhi
	Subhiksha (Discounter)	Subhiksha	112	1,500	Tamil Nadu
	Radhe	Nirma	3	100	Gujarat
Supermarket	Foodworld	RPG	75	3,600	Tamil Nadu, AP, Karnataka
	Nilgiri's	Nilgiri's	30	5,00	Tamil Nadu, Karnataka
	Sabka Bazaar	Sabka Bazaar	19	110	Delhi
	Haiko	Lakewood Mall Pvt Ltd	1	120	Mumbai
	Trinetra	Trinetra	19	400	AP
	Ravji's	Adani	5	150	Gujarat
	Shoprite	Shoprite, South Africa	Opening shortly	–	Mumbai
Hypermarket	Giant (Discounter)	RPG	1	850	Hyderabad
	Big Bazaar (Discounter)	Pantaloons	5	1800	Delhi, Mumbai, Hyderabad, Kolkatta, Bangalore
Cash & Carry	Metro	Metro	1	–	Bangalore
	Mother Dairy Daily Fresh	Mother Dairy	Opening shortly	–	Bangalore

Source: industry Sources, * for year 2003

Appendix # 11
Institutional Structure for Agricultural and Rural Credit in India



Source: Rabobank Research

The key institutional players in rural credit are Commercial Banks (approximately 33,000 semi urban and rural branches), Regional Rural Banks (196 RRBs with approximate 14,000 branches), Cooperative Banks (approximate 1,00,000 branches) and Land Development Banks.

Appendix # 12

Preconditions for Implementation of Warehouse Receipt Financing

1. An appropriate legal environment

The legal environment must ensure ease in enforceability of the security and the banks must be comfortable to lend against warehouse receipts. The law should define the following aspects in detail:

- The quality and quantity of the goods stored (credibility of the receipt)
- The rights, liabilities and duties of each party to the warehouse receipt must be clearly defined
- Receipts must be clearly transferable by delivery or endorsement
- If the warehouse owner defaults or his business is liquidated, the holder of the receipts must have the right to receive the stored goods or the financial equivalent.
- Negotiability of warehouse receipts- the status of a pledge is unclear under Indian law, and in the event of a borrower's insolvency, the other creditors will enjoy a prior claim over the receipt holder.
- Uniformity of warehouse receipts across States
- Netting of fungible goods across locations

2. Reliable warehouses at appropriate locations

The warehouses should have appropriate facilities for storage such that the grain does not deteriorate. Further, if there are multiple users of the warehouse, the facilities should be such that there is no mixing of the produce. They should be professionally managed and be upgraded periodically. There is a need for development of adequate and quality warehousing systems in India.

3. A system of licensing, inspection and monitoring of warehouses

A good inspection system for the participating warehouses is an important precondition. Due to the fact that the issued warehouse receipts will be treated by all parties as an asset of high liquidity and value, the inspections have to be rigorous to ensure that the predetermined minimum acceptable standards for the warehouse are met.

The inspection shall not only be focused upon the technical standards, but also on the financial strength of the operator, the ability to store according to quality standards, and administrative capabilities to ensure that management of the warehouse fulfills the required administrative procedures.

A monitoring system with frequent site visits is required. In some countries, State Licensing and Inspection Agencies execute this task while in others, private, independent national or international companies provide these services.

4. Financiers' involvement

International experiences with warehouse receipt based financing highlight the importance of involvement of strong local banks, as early as possible in the implementation of the program. Their staff has to be trained and clear procedures for evaluation of the commodity must be laid out. In order to reduce the risks associated with commodities, most banks will lend a certain

percentage of the market value of the commodity stored, which in the initial years can be 50-60% of market value.

5. Strong support of public authorities

Strong support of the public authorities is required to set up an efficient warehouse receipt financing system. Their assistance is needed to establish the institutional framework, which would include the following aspects:

a. Assist in setting up of the licensing and monitoring system.
b. Facilitate direct processor farmer linkages (rather than via the mandi) to enable warehouse receipt based financing
c. Dematerialisation of the warehouse receipt to enable electronic trading
d. Development of secondary market for warehouse receipt trade

6. Well trained participants

Participants need to have in-depth understanding of the operations of warehouse receipt systems, including procedures and risk factors. The scale of operations needs to be large, or small farmers need to form associations/groups (which should be a legal entity) to pool the produce, thus lowering transaction costs on the one hand, as also allowing processors access to larger lots of produce.

7. Certification of commodities.

Grading and standardisation of commodities is essential due to the existence of a large number of varieties which renders price discovery difficult. Credible certifying organizations who can undertake the task of verification of the commodities stored are required.

Sales Tax: Imposition of sales taxes is an impediment to warehouse receipts. Such taxes are chargeable on goods changing hands in warehouses, with taxes payable on each transaction. These taxes are often higher than the total gross margin earned by market intermediaries.

(2) Commodity selection

The commodity to be financed under this kind of structure needs to meet the following criteria:

a. **Non perishable with developed warehousing systems**: The commodity should be amenable to storage without any significant deterioration in quality or quantity over the tenor of financing. Also there should be a developed and reliable warehousing set-up for the commodity. This is essential from the lender's perspective because improper storage or any inaccuracies in the warehoused quantity/ quality may lead to a fall in security cover. It may be advantageous if the warehouse providers would be agreeable to providing value added services as may be required by the financing structure.

b. **Developed market:** There should be a developed market for the commodity, providing liquidity without steep transaction costs. This is essential to provide an avenue for immediate and efficient liquidation of the security if required. In addition, availability of price trends and other trade information about the commodity is essential from the perspective of developing accurate margin norms.

c. Presence of derivatives market: The presence of a derivatives market would be beneficial from a lender's perspective, as this will allow hedging of price risk.

d. Availability of neutral intermediaries: Neutral intermediaries are required to be an interface for the lender with the traders. Services that can be provided by the intermediaries include:

- Due diligence of borrowers
- Quality assessment of the commodity
- Historical price and other market information for the commodity
- Faster arbitration and settlement mechanisms

  These intermediaries can be service providers, Collection and Management Agencies (CMAs) etc.